



COMMONWEALTH OF PUERTO RICO
Office of the Governor
Environmental Quality Board

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Environmental Emergencies Response Area

August 14, 2008

Mr. Kevin Cloe, P.E.
Remedial Project Manager
Commander Atlantic Division
Naval Facilities Engineering Command
6506 Hampton Boulevard
Norfolk, VA 23508-1278

RE: Review of the Draft Site Inspection/Expanded Site Inspection Sampling and Analysis Plan, Former Vieques Naval Training Range, Vieques, PR

Dear Mr. Cloe:

The Puerto Rico Environmental Quality Board (PREQB) has completed its review of the Navy's Draft Site Inspection/Expanded Site Inspection Sampling and Analysis Plan, Former Vieques Naval Training Range, Vieques, Puerto Rico, dated July 2008. Enclosed our comments.

Please contact me at (787) 767-8181 X.6141 if you have any questions or comments about our review.

Cordially,

Wilmarie Rivera
Federal Facilities Coordinator

cc: Daniel Rodríguez - EPA
Richard Henry - FWS
Brett Doerr - CH2M Hill
Daniel Hood - Navy
Christopher Penny - Navy

PREQB Technical Evaluation
Draft
Site Inspection/Expanded Site Inspection Sampling and Analysis Plan,
Former Vieques Naval Training Range,
Vieques, Puerto Rico,
July 2008

- 1) Executive Summary
 - a) Clarify why SWMU 4 is not included in this SI/Expanded SI SAP. According to the April 2008 ERP meeting minutes, one purpose of installing the regional groundwater wells is to confirm that there has been no release from SWMU 4.
 - b) Table ES-1
 - i) SWMU 2 - The Sample Analysis parameters listed are not in agreement with the Navy's responses to the November 2007 EPA comments 17a and 17b on the Draft PA/SI report. The Navy's response provided new language for Section 4.4 of the PA/SI report which stated that the sample analyses would include TCL VOCs (not only BTEX/MTBE), TCL SVOCs (not only PAHs), TAL metals (not only lead), TPH-GRO, and TPH-DRO. Since the Navy's response was accepted during the April 2-3, 2008 meeting, please revise Table ES-1 to reflect these parameters. It should also be noted that the PA/SI report includes TCL VOCs, TCL SVOCs, and TAL metals under the Recommendations Section for this SWMU.
 - ii) SWMU 6/7 - Clarify why the installation of a monitoring well downgradient of these sites is not included under Investigation Tasks since the reasoning for the well is to determine if groundwater has been affected by these sites.
 - iii) SWMU 10 - Change the reference to Figure 10 under Investigation Tasks to Figure 7.
 - iv) PI 5 - Under Investigation Tasks, include the potential to collect additional samples if contamination is found in samples near the runway but not further downstream and if contamination is found in all samples, as discussed in Worksheet #9b.
 - v) PAOC M - The Sample Analysis parameters listed are not in agreement with Worksheet #9b which summarizes the scoping meeting on October 18, 2007. As per Worksheet #9b, update the Sample Analysis parameters to include TCL SVOCs and TAL metals (not BTEX/MTBE, PAHs, lead, TPH-GRO, and TPH-DRO).
 - vi) Regional Groundwater - During the scoping meeting on April 2-3, 2008, it was agreed upon to analyze groundwater samples for the same parameters done on previous Regional groundwater samples in order to be able to compare the new data to previously collected groundwater data. Therefore, the Sample Analysis parameters should additionally include pesticides and PCBs. It should be noted that Worksheet #20 includes all parameters (VOCs, SVOCs, pesticides, PCBs, and inorganics).
- 2) Worksheet #3 - Distribution List

- a) The Navy QA Officer, Sherri Eng, should be included on the Distribution List for the SAP.
 - b) As per Section 2.3.1 of the UFP for QAPPs Manual (EPA-505-B-04-900A, March 2005), add the CH2M Hill Field Team Manager (Stephen Brand), CH2M Hill Project Manager (John Swenfurth), laboratory personnel, and the Data Validation subcontractor to the Distribution List for the SAP.
 - c) Change the name of PREQB president to Javier J. Rúa, Esq. Also, please change his email to: JavierRua@jca.gobierno.pr
- 3) Worksheet #4 - Project Personnel Sign-off Sheet
 - a) Include Diana Wehner on this worksheet since she is included on Worksheet #5 as one of the regulatory/stakeholder agencies.
 - b) Include CH2M Hill Project Chemist and Project Data Manager on this list. It is imperative that these people also read and understand the SAP.
 - c) Wilmarie Rivera phone extension should read: (x. 6141)
 - 4) Worksheet #5: Project Organizational Chart
 - a) See comment #6b.
 - 5) Worksheet #6: Communication Pathways
 - a) The CH2M Hill Project Chemist is listed as the person responsible for Analytical Corrective Actions. The table refers the procedure for these corrective actions to Worksheets #24, 25, and 28. However, per these latter worksheets, the person responsible for analytical corrective actions is the Lab Analyst or Analyst Supervisor, not the CH2M Hill Project Chemist. The latter worksheets appear to be more accurate in this regard. Update the worksheets accordingly to ensure consistency and accuracy.
 - 6) Worksheet #7: Personnel Responsibilities and Qualifications Table
 - a) Add education and experience qualifications for Sherri Eng, the Navy QA Officer.
 - b) Please clarify why Madeline Rivera, the Vieques ERP Site Manager, is not included on Worksheet #5, Project Organizational Chart.
 - 7) Worksheet # 9a: Project Scoping Session Participant Sheet
 - a) Wilmarie Rivera's phone extension should read: (x. 6141)
 - 8) Worksheet #9b: Project Scoping Session Participants Sheet
 - a) October 18, 2007 meeting, PI 5 - The last sentence of this section notes that if contamination is found in samples near the runway, but not further downstream, additional samples between these locations may be necessary. In addition, it also states that if contamination is found in all of the samples, additional downstream samples may be necessary. This sampling strategy is not included in any other Worksheets in this SAP. Add this sampling strategy and rationale for sampling to Worksheets #10k and 17.

- 9) Worksheet #9c: Project Scoping Session Participants Sheet
- a) Page 50, Paragraph 6 states that the anticipated specifications of the wells (depths, screen lengths, etc.) will be added to site-specific worksheets. This information could not be located in any of the Worksheets included in this SAP and must be provided for SWMU 1, PI 4, and Regional Groundwater investigations.
 - b) Add phone extension (x.6141) to Wilmarie Rivera's phone number.
- 10) Worksheet #10: Problem Definition
- a) Please clarify why SWMU 4 is not being included as a site since the installation of one well is being used to confirm there has not been a release from this SWMU.
 - b) Page 55, Problem Definition – Please describe or include a reference to the methodology that will be used to conduct “more realistic evaluations” should exceedances of the screening criteria presented in Worksheet #15 occur.
- 11) Worksheet #10a: SWMU 1 (Camp Garcia Landfill) Problem Definition
- a) Environmental questions to be Answered by the Expanded SI, Question 2 – the question asks about the nature of the waste materials. The response is to refer the reader to Question 1 to determine the vertical extent of contamination. The response should address the nature (i.e., what action will be taken to determine what types of wastes and contaminants are present), not the vertical extent. Please revise the response to this question accordingly.
 - b) Environmental Questions to be Answered, Question 3 - The text states that a three-point composite will be collected from the soil surrounding the waste (if present). Worksheets #9c and 14 and Table ES-1 state that the soil will be collected within or through the vertical debris profile. Clarify if “soil surrounding the waste” is equivalent to soil “within or through the vertical debris profile.”
 - c) Environmental Questions to be Answered, Question 5 - Clarify in this section whether surface water samples will be collected for total and filtered metals. It is assumed that filtered surface water samples will be collected in addition to total since Worksheet #15-15a (metals, filtered surface water) was provided. This is the only site where surface water is applicable so it is assumed that Worksheet #15-15a was included on the basis of the surface water collected from this site.
- 12) Worksheet #10b: SWMU 2 (Fuels Offloading Site) Problem Definition
- a) Synopsis of Secondary Data, Paragraph 2,- Change SWMU 1 to SWMU 2 in the first sentence.
 - b) Environmental Questions to be Answered, Question 1 - The text states that a subsurface soil sample will be collected only if bedrock is deeper than the surface soil interval. This stipulation was not mentioned in any of the meeting notes from Worksheets #9b and 9c. Please clarify.
 - c) Environmental Questions to be Answered, Question 1- The last sentence lists the analysis parameters which are not in agreement with the Navy's responses to the November 2007 EPA comments 17a and 17b on the Draft PA/SI report. The Navy's response provided new language for Section 4.4 of the PA/SI report which stated that the sample analyses would include TCL VOCs (not only

BTEX/MTBE), TCL SVOCs (not only PAHs), TAL metals (not only lead), TPH-GRO, and TPH-DRO. Since the Navy's response was accepted during the April 2-3, 2008 meeting, this section must be revised to reflect these parameters. It should also be noted that the PA/SI report includes TCL VOCs, TCL SVOCs, and TAL metals under the Recommendations Section for this SWMU.

- d) Environmental Questions to be Answered by the Expanded SI, Question 2 – Please revise the last three words of the response to this question to “will be installed during the Expanded SI.” Although observations may not indicate contamination, the final decision will be made concerning whether monitoring wells are needed once the laboratory data have been reviewed.
- 13) Worksheet #10c: SWMUs 6/7 (Waste Oil and Paint Accumulation Areas) Problem Definition
- a) Clarify why the installation of a monitoring well downgradient of these sites is not included under Environmental Questions to be Answered by the Expanded SI since the reasoning for the well is to determine if groundwater has been affected by these sites.
- 14) Worksheet #10f: AOC G (Pump Station and Chlorination Building at Sewage Treatment Lagoons) Problem Definition
- a) Background and Potential Release History, Paragraph 1, last sentence - Change AOC A to AOC G.
 - b) Problem Definition - The first paragraph does not appear to present information consistent with the current understanding of AOC G. This paragraph indicates that a spill has occurred that warrants soil removal and confirmatory sampling. Please review and revise accordingly.
- 15) Worksheet #10h: PI 7 (Former Quarry, Tar Drum Disposal Area, and Radar Communication Area) Problem Definition
- a) Synopsis of Secondary Data - The 2002 reference in the first sentence is not included in the References Section. Either include this reference in the References Section or revise it to 2003, which is included in the References Section.
 - b) Environmental Questions to be Answered, Question 1 - Include the potential to collect subsurface soil samples to evaluate vertical extent if visual observations or PID show evidence of a release, as per Worksheets #9c and 11.
- 16) Worksheet #10i: PAOC L (Former Paint and Transformer Storage Area) Problem Definition
- a) Clarify why the installation of a monitoring well downgradient of this site is not included under Environmental Questions to be Answered by the Expanded SI since the reasoning for the well is to determine if groundwater has been affected by this site.
- 17) Worksheet #10k: PI 5 (Former Airfield and Associated Ditches) Problem Definition

- a) Environmental Questions to be Answered, Question 2 - Include the potential to collect additional samples if contamination found in samples near runway but not further downstream and if contamination found in all samples, as discussed in Worksheet #9b.
- 18) Worksheet #10l: PI 6 (Former PCB Storage Pad and Vehicle Wash Pad) Problem Definition
- a) Synopsis of Secondary Data, Paragraph 2, third sentence - Include the six metals which were detected, as done for other sites on Worksheets #10.
- 19) Worksheet #10m: PI 8 (Former Motor Pool Maintenance Area) Problem Definition
- a) Background and Potential Release History, Page 87 - The text states that the 1962 aerial photograph shows the location of a drainage ditch between PI 8 and PI 5. However, this was not evident on the associated Figure 27 because PI 5 cannot be seen. Label Figure 27 accordingly, as one sampling location is based on the location of this drainage ditch.
- 20) Worksheet # 10n: PI 10 (Former Wastewater Leach Field) Problem Definition
- a) Environmental Questions to be Answered by the Expanded SI, Question 1 – Please clarify that the sample collected at the base of the sludge will be representative of sludge only and not include native material from beneath the base of the sludge.
- 21) Worksheet #10p: PAOC M (Former Fuel Facility) Problem Definition
- a) Background and Potential Release History - Delete the reference to Figure 35 in the first sentence as this Figure is not associated with PAOC M.
 - b) Environmental Questions to be Answered, Question 1 - Change the reference of Figure 38 to Figure 36.
 - c) Environmental Questions to be Answered, Question 1 - The analytical parameters cited in the text are not in agreement with Worksheet #9b which summarizes the scoping meeting on October 18, 2007. As per Worksheet #9b, update the analytical parameters to include TCL SVOCs and TAL metals (not BTEX/MTBE, PAHs, lead, TPH-GRO, and TPH-DRO).
- 22) Worksheet #10u: Regional Groundwater Problem Definition
- a) Change the header of Environmental Questions to Be Answered to reflect the groundwater sampling instead of debris removal.
 - b) Environmental Questions to be Answered, Question 1 - During the scoping meeting on April 2-3, 2008, it was agreed upon to analyze groundwater samples for the same parameters done on previous Regional groundwater samples in order to be able to compare the new data to previously collected groundwater data. Therefore, the analytical parameters should additionally include pesticides and PCBs. It should be noted that all agreed-upon parameters are listed on Worksheet #20 for this investigation.
 - c) Please reference Figure 3 in this section. The location of the well downgradient from the western half of Camp Garcia appears to be too far to the west to be

representative of groundwater conditions. This monitoring well should be moved easterly to a location directly downgradient from the western sites at Camp Garcia.

23) Worksheet #11: Project Quality Objectives/Systematic Planning Process Statements

- a) Question #3 - Paragraph 2 should also include surface water and sediment sampling.
- b) Question #3, SWMU 1 - The procedure listed for collection of samples for VOCs within the waste profile (selection of one depth) is not in accordance with the procedure discussed at the April 2-3, 2008 meeting and summarized in Worksheet #9c. The agreed-upon procedure would include collection of three separate EnCore samplers at each of the three depth intervals within the waste profile and the laboratory would combine these for a three-point composite sample. There should not be a concern over obtaining a sample for low-level VOC analysis (as mentioned in this section) since the majority of the Residential Regional Screening Levels (RSLs) will be achieved via methanol preservation. As per Question #5 in this worksheet, these are the more relevant action levels. Therefore, the agreed-upon procedure should be used for collection of samples for VOCs within the waste profile, and this section should be updated accordingly.
- c) Question #5, bullet 3 - This bullet should be clarified to note that reporting of estimated values between the MDL and RL only applies to VOCs and SVOCs (i.e., GC/MS analyses). This approach could result in significant false positive results for pesticides, PCBs, and metals and should therefore not be used with these analyses.
- d) Table on pages 113-115:
 - i) SWMU 2, Sample Analyses column - See comment #12c.
 - ii) SWMU 2, Target Analytes column - The target analytes for this site should not be listed as "no target analytes." As per pages 4 and 5 of the April 2-3, 2008 meeting minutes, these are SVOCs and lead.
 - iii) SWMU 2, RLs > PALs for Target Analytes column - Clarify why residential RSL exceedances for target analyte RLs are not called out. Based on the fact that PAHs are constituents of concern at this site, the residential RSL exceedances for benzo(a)pyrene and dibenz(a,h)anthracene RLs need to be called out. In addition, conclusions on how this will be dealt with for decision-making need to be provided.
 - iv) SWMU 6/7, RLs > PALs for Target Analytes column - Clarify why the SSL exceedance for the delta-BHC RL and the ecological screening level for the heptachlor RL are not called out. Based on the fact that these pesticides were detected above screening criteria in the RFI, the exceedances for these RLs need to be called out. In addition, conclusions on how this will be dealt with for decision-making need to be provided.
 - v) SWMU 6/7, Conclusion column - The text states that the methylene chloride MDL is below the RSL and SSL and therefore, the MDL and RL are sufficient for making site-specific determinations. However, according to Worksheet #15-1, the MDL for methylene chloride is 2.71 µg/kg and the SSL is 1.3 µg/kg. Therefore, this is a false statement and needs to be corrected.

- vi) SWMU 10, Conclusion column – Samples are being collected at this site to confirm past thallium results due to significant uncertainty associated with past laboratory methods. Justifying an elevated RL for thallium with the MDL is not acceptable; concentrations reported between the MDL and RL have a significant level of uncertainty. Therefore, please ensure that the laboratory RL is 1 µg/L as shown in the Worksheet 15-14 that was presented in the April 2008 meeting, and delete the discussion of justifying the elevated RL in this section.
- vii) PI 4, RLs > PALs for Target Analytes column - Add tetrachloroethene to the list of RLs > PALs. The Tap Water RSL is 0.11 µg/L and the RL, per Worksheet #15-9, is “To Be Determined”. This could be a potential uncertainty and an explanation is needed on how the objectives will still be met if the RL exceeds 0.11 µg/L. Since this was one of the VOCs detected in the 2006 PA/SI and is therefore one of the reasons for the resampling, this needs to be explained.
- viii) PAOC L, Conclusion column - The text justifies the endrin RL above the ecological screening level by stating that the endrin MDL is similar to the ecological screening level. However, according to Worksheet #15-3, the MDL for endrin is 0.77 µg/kg and the ecological screening level is 0.04 µg/kg. Therefore, this is a false statement and needs to be corrected.
- ix) PI 6, Target Analytes column - Based on the Background Summary and Synopsis of Secondary Data provided in Worksheet #10I, change the target analytes for this site to metals and PCBs instead of “no target analytes.”
- x) PI 6, RLs > PALs for Target Analytes and Conclusion column - As per comment #18a, the metals which exceeded screening levels in the past investigation were not provided. If arsenic is included in this list of metals, the RL exceedance of the residential RSL and the justification should be provided in these two columns, as was done for SWMU 6/7.
- xi) PI 8, Conclusion column - The text states that the methylene chloride MDL is below the SSL and therefore, the MDL and RL are sufficient for making site-specific determinations. However, according to Worksheet #15-1, the MDL for methylene chloride is 2.71 µg/kg and the SSL is 1.3 µg/kg. Therefore, this is a false statement and needs to be corrected.
- xii) PAOC M, Sample Analyses column - see comment #21c.
- xiii) PAOC M, RLs > PALs for Target Analytes column - Clarify why residential RSL exceedances for target analyte RLs are not called out. Based on the fact that PAHs are constituents of concern at this site, the residential RSL exceedances for benzo(a)pyrene and dibenz(a,h)anthracene RLs need to be called out. In addition, conclusions on how this will be dealt with for decision-making need to be provided.
- xiv) Regional Groundwater, Sample Analyses column - PCBs are included in the list of sample analyses which falls more in line with the request made in comment #22b. However, based on comment #22b, pesticides must also be added to this list. In addition, Worksheet #20 includes pesticides as well for the Regional Groundwater investigation.

- xv) Regional Groundwater, RLs > PALs for Target Analytes column - This column should not be listed as "N/A". Add tetrachloroethene to the list of RLs > PALs. The Tap Water RSL is 0.11 µg/L and the RL, per Worksheet #15-9, is "To Be Determined". This could be a potential uncertainty and an explanation is needed on how the objectives will still be met if the RL exceeds 0.11 µg/L. In addition, the Tap Water RSL for chloroform is 0.19 µg/L and the RL, per Worksheet #15-9 is 1 µg/L; include this exceedance in this column.
- e) Question #6 - In the second to last sentence, include "drums" with debris and/or soil removal as this is applicable to PI 7 also referenced in this sentence.
- f) Please remove the criterion "order of magnitude" from the PQP statement for determining that additional soil sampling data will be collected. The information collected during the Expanded SI will be evaluated to determine if additional sampling, including soil sampling, is warranted to determine trends, extent and sources of contamination. The revised text should indicate that the data provided in the Expanded SI will be used to determine if additional sampling is warranted.

24) Worksheet #12: Measurement Performance Criteria Table

- a) As per Section 2.6.2 of the UFP QAPPs Manual, laboratory QC (e.g., surrogates, LCS, method blanks) is also required to be included in these worksheets. It is understood that this information is also included in Worksheet #28. Include a footnote on all Worksheets #12 (12-1 through 12-24) to refer to Worksheet #28 for laboratory QC measurement performance criteria.
- b) As per Section 2.6.2 of the UFP QAPPs Manual, completeness goals are required to be included. Either add a row to Worksheets #12-1 through 12-24 with the completeness goals or include a section on Worksheet #11 for this information on a project-wide basis.
- c) Worksheet #12-2 - As per Worksheets #15-2, 15-2a, and 15-2b, di-n-butylphthalate and bis(2-ethylhexyl)phthalate are being analyzed by SIM. Therefore, the SIM equipment rinsate blank measurement performance criteria should be the same as the full scan low method.
- d) Worksheet #12-5 - Include a trip blank for TPH-GRO.
- e) Worksheet #12-9 - Include an MS/MSD for the VOC-SIM analyses. Note that MS/MSDs were included for VOC-SIM in Worksheet #28-9.
- f) Worksheet #12-10 - As per Worksheets #15-10 and 15-10a, di-n-butylphthalate and bis(2-ethylhexyl)phthalate are being analyzed by SIM. Therefore, the SIM equipment rinsate blank measurement performance criteria should be the same as the full scan low method.
- g) Worksheet #12-11 - Change the last column to "A" for Analytical for the MS and MSD.
- h) Worksheet #12-13 - Include a trip blank for TPH-GRO.
- i) Worksheet #12-14 - Change the Data Quality Indicator for MS/MSDs under Metals and mercury to include Precision in addition to Accuracy/bias.
- j) Worksheet #12-15 - Change the Data Quality Indicator for MS/MSDs under Metals and mercury to include Precision in addition to Accuracy/bias.

25) Worksheet #13: Secondary Data Criteria and Limitations Table

- a) As per page 5 of the minutes to the April 2-3, 2008 meeting, this worksheet should note where historical data are going to be combined with newly collected data for purposes of screening. The same statement was included for all sites but there should be a description of how data will be considered "appropriate" for incorporating into the comprehensive data set for each site. For example, at SWMU 10, data are being collected to confirm previous thallium results. If results are different from the previous investigation, will the historical data still be combined into the comprehensive data set?
- b) As per Section 2.7, page 58 of the UFP QAPPs Manual, the column entitled "Limitations on Data Use" should note if the data in question have not been validated. If this applies to any of these data sets, add this notation to the column.

26) Worksheet #14: Summary of Project Tasks

- a) Monitoring Well Development - Please clarify how it will be determined in the field if a well will be redeveloped. This affects SWMU 1, PI 4, and PAOC L where previously installed wells will be sampled. The procedure that will be used at each of these wells and the criteria used for determining the need for redevelopment must be included in the QAPP.
- b) Sample Analysis - Include sediment and surface water with the list of matrices that will be analyzed by the laboratory.
- c) SWMU 1:
 - i) Subsurface Soil Characterization within the Waste Material - see comment #23b regarding the collection of samples within the vertical waste profile for VOCs.
 - ii) Ephemeral Stream Bed Sampling - Add the possibility of sampling a stream along the southwestern portion of the landfill.
 - iii) Monitoring Well Development - As per comment #26a, include the possibility of redeveloping the existing 2004 wells.
- d) PI 4, Monitoring Well Development - As per comment #26a, include the possibility of redeveloping the existing 2006 wells.
- e) PAOC L, Monitoring Well Sampling - As per comment #26a, include the possibility of redeveloping the existing 2006 well.
- f) PAOC X, Soil Sampling - Worksheet #10t states that four confirmatory soil samples will only be collected in the 6-inch interval immediately beneath the debris. This section states that surface and subsurface soil samples will be collected beneath the removed debris piles. Please confirm the sampling approach and ensure both this worksheet and Worksheet #10t are consistent.

27) Worksheet #15: Reference Limits and Evaluation Table

- a) Worksheet #15-1 (VOCs, surface soil):
 - i) Footnote #5 - As per comments #12c and #21c, the exceptions to all VOCs at SWMU 2 and PAOC M need to be deleted from the footnote.
 - ii) Footnote #6 - It is unclear why the QLs were elevated to 3x the MDL for strict DOD QSM compliance. If these elevated QLs are included in this Worksheet, then the laboratory must be informed that they must use these instead of their

routine QLs. This may result in confusion in reporting data. The elevation of these QLs to 3x the MDL may want to be reconsidered. As long as the QL is based on the lowest calibration standard, it is still technically accurate.

- b) Worksheets #15-1a, 15-1b, 15-2, 15-2a, 15-2b, 15-3, 15-3a, 15-3b, 15-6, 15-6a, 15-6b, 15-9, 15-9a, 15-10, 15-10a, 15-11, 15-11a, 15-14, 15-14a - Footnote #6 from Worksheet #15-1 should be included here since several QLs were elevated to 3x the MDL. However, if this procedure is being eliminated, the addition of the footnote is not required.
- c) Worksheet #15-1b (VOCs, sediment) - Delete footnote #5; it is not applicable to sediment.
- d) Worksheets #15-2 (SVOCs, surface soil), 15-2a (SVOCs, subsurface soil), and 15-2b (SVOCs, sediment):
 - i) The Concentration Range column should be changed to SIM for benzo(g,h,i)perylene based on the laboratory QL.
 - ii) Footnote #5 - As per comments #12c and #21c, the exceptions to all SVOCs at SWMU 2 and PAOC M need to be deleted from the footnote.
 - iii) Footnote #5 - The footnote includes those compounds to be analyzed by SIM. But, the table shows many more compounds being analyzed by SIM that are not included in this footnote (hexachloroethane, 2-chloronaphthalene, hexachlorobenzene, carbazole, di-n-butylphthalate, bis-[2-ethylhexyl]phthalate, and 1,4-dioxane). Please clarify. The use of SIM should also be dependent on the matrix, depending on the project action levels; therefore, QLs for Worksheets #15-2, 15-2a, and 15-2b may need to be different.
 - iv) Footnote #5 - Clarify what is meant by "Low" analysis for SVOCs.
- e) Worksheets #15-3, 15-3a, 15-3b, 15-11, 15-11a, Footnote #5 - Clarify what is meant by "Low" analysis for Pesticides and Aroclors.
- f) Worksheets #15-6 (Metals, surface soil), 15-6a (Metals, subsurface soil), and 15-6b (Metals, sediment) - Footnote #5 - Clarify what is meant by "Low" analysis for metals and cyanide.
- g) Worksheet #15-9 (VOCs, groundwater)
 - i) Provide a rationale for why 1,1-dichloroethene is being performed using SIM; the full scan QL is below the project action levels.
 - ii) Many other compounds are listed as having QLs above the project action levels. Provide the rationale for which compounds were selected to analyze using SIM and why others (i.e., benzene, 1,1,2-trichloroethane, 1,1,2,2-tetrachloroethane, and 1,4-dichlorobenzene) were not.
- h) Worksheets #15-10 (SVOCs, groundwater) and 15-10a (SVOCs, surface water)
 - i) Footnote #5 - The footnote includes those compounds to be analyzed by SIM. But, the table shows many more compounds being analyzed by SIM that are not included in this footnote (hexachloroethane, 2-chloronaphthalene, hexachlorobenzene, carbazole, di-n-butylphthalate, bis-(2-ethylhexyl)phthalate, and 1,4-dioxane). Please clarify. The use of SIM should also be dependent on the matrix, depending on the project action levels; therefore, QLs for Worksheets #15-10 and 15-10a may need to be different.

- ii) Footnote #5 - Clarify what is meant by “Low” analysis for SVOCs.
 - i) Worksheet #15-14 (Metals, groundwater) - Worksheet 15-14 presented at the April 2008 meeting shows a RL for thallium of 1 µg/L. Please revise this worksheet to show the RL as presented at the meeting and confirm that the laboratory will be reporting down to 1 µg/L.
 - j) Worksheet #15-14a (Metals, surface water) - Remove the shading from the antimony row since the QL is below both project action levels.
- 28) Worksheet #16: Project Schedule/Timeline Table
- a) Well development and sampling of SWMU 10 preexisting wells is scheduled for March 11 and 12, 2009. EPA Guidance (OSWER Directive 9360.4-16) recommends a two week period between development and sampling to allow the groundwater around the well to recover. Update the schedule accordingly.
 - b) Section 2.8.2 of the UFP QAPPs Manual states that dates of quality assessments and deliverables should be provided on this Worksheet. Include the dates that data validation will be performed and the dates that reports will be generated summarizing the results of the investigations.
- 29) Worksheet #18: Sampling Locations and Methods/SOP Requirements Table
- a) SWMU 1
 - i) For all subsurface soil samples below the waste, change the depth to “6 inches below the waste” instead of “bottom of waste”. This is consistent with Worksheet #10a.
 - ii) Depending on the resolution to comment #23b, the matrix and depth may need to be changed for composite samples for VOCs.
 - iii) As per Worksheet #12-8, add one field duplicate sample for pH and TOC analyses and one matrix spike sample for TOC analysis.
 - iv) Specify total and dissolved metals under Analytical Group for the surface water samples SW-01, SW-02, and SW-03, as was done for sample SW-04.
 - v) Worksheet #20 shows one of the solid samples from the ephemeral stream will be submitted for pH, TOC, bulk density, and grain size analyses. Update these two worksheets to be consistent (with or without these analyses).
 - vi) Worksheet #20 shows one of the surface water samples from the ephemeral stream will be submitted for TDS and chloride analyses. Update these two worksheets to be consistent (with or without these analyses).
 - vii) Groundwater sample MW01 is the only groundwater sample not being analyzed for TDS and chloride. Please confirm this is correct.
 - b) SWMU 2
 - i) Please refer to comment #12c regarding the Analytical Group listed in this worksheet for the soil samples.
 - ii) As per Worksheet #12-8, add one field duplicate sample for pH and TOC analyses.
 - c) SWMU 6/7 - As per Worksheet #12-8, add one field duplicate sample for pH and TOC analyses.
 - d) SWMU 10

- i) As per Worksheet #12-8, add one field duplicate sample for pH and TOC analyses and one matrix spike sample for TOC analysis.
 - ii) The Depth column for subsurface soil should not state “As per MQAPP Attachment 7”. As per Worksheet #11, Question #3, subsurface soil sample depths will not follow the Master QAPP; these samples will be collected just above the bottom of the lagoon material, if it can be visually distinguished from the native material. Therefore, include TBD for the depth of these subsurface soil samples.
- e) AOC A
- i) Change the Depth column for all subsurface soil samples at the bottom of the excavation from “TBD” to “0-6 inches below the bottom of the excavation.”
 - ii) Change the Depth column for all subsurface soil samples on the sides of the excavation from “TBD” to “0-1 foot below the depth of backfill.”
- f) AOC G - As per Worksheet #12-8, add one matrix spike sample for TOC analysis.
- g) PI 7 - As per Worksheet #12-8, add one matrix spike sample for TOC analysis.
- h) PAOC L - As per Worksheet #12-8, add one field duplicate sample for pH and TOC analyses and one matrix spike sample for TOC analysis.
- i) PI 5 - As per Worksheet #12-8, add one field duplicate sample for pH and TOC analyses and one matrix spike sample for TOC analysis.
- j) PI 6
- i) Add one field duplicate for PCBs in soil.
 - ii) Change the Depth column for the sump surface soil sample to “0-1 foot”; change the Depth column for the sump subsurface soil to TBD.
 - iii) Add 1 MS/MSD for VOCs, SVOCs, and metals in soil and one MS for TOC.
- k) PI 8
- i) As per Worksheet #12-8, add one field duplicate sample for pH and TOC analyses.
 - ii) For sample VEP8-SO13, add the number “1” in the Number of Samples column.
- l) PI 10
- i) As per Worksheet #12-8, add one field duplicate sample for pH and TOC analyses and one matrix spike sample for TOC analysis.
 - ii) The Depth column for subsurface soil should not state “As per MQAPP Attachment 7”. As per Worksheet#11, Question #3, subsurface soil sample depths will not follow the Master QAPP; these samples will be collected just above the bottom of the lagoon material, if it can be visually distinguished from the native material. Therefore, include TBD for the depth of these subsurface soil samples.
- m) PAOC I - As per Worksheet #12-8, add one field duplicate sample for pH and TOC analyses and one matrix spike sample for TOC analysis.
- n) PAOC O - As per Worksheet #12-8, add one matrix spike sample for TOC analysis.
- o) PAOC M - Add this site to Worksheet #18 in order to show the sample identification scheme, the parameters that will be analyzed, and the sampling SOP reference that will be used in the event samples are collected.

- p) PAOC Q - As per Worksheet #12-8, add one field duplicate sample for pH and TOC analyses
 - q) PAOC X
 - i) As per Worksheet #12-8, add one field duplicate sample for pH and TOC analyses and one matrix spike sample for TOC analysis.
 - ii) The Depth column for subsurface soil should not state "As per MQAPP Attachment 7". As per Worksheet #11, Question #3, soil sample depths will not follow the Master QAPP. Change surface soil sample depths to "0-6 inches below the bottom of the debris." Change subsurface soil sample depths to "TBD."
 - r) Regional Groundwater Study - As per comment #22b, the Analytical Group column should also include pesticides and PCBs. It should also be noted that Worksheet #20 includes pesticides and PCBs for the Regional Groundwater investigation.
- 30) Worksheet #19: Analytical SOP Requirements Table
- a) Add sediment to all surface (SS) and subsurface (SB) soil rows.
 - b) Add surface water to all groundwater (GW) and aqueous (AQ) sample rows.
 - c) Clarify what "WM" stands for in the Containers column.
 - d) Add a row for TPH-GRO in surface and subsurface soil (SOPs CA-316 and CA-320).
 - e) Matrix SS & SB, VOCs
 - i) Add SOP CA-214 (5035) to the SOP Reference column.
 - ii) Confirm containers and preservation columns; according to previous documentation, none of the solid samples for VOCs will be preserved in the field. Therefore, references to these vials can be removed.
 - iii) Change the sample volume from 1 VOA vial to three 5-gram EnCores.
 - iv) Change the holding time as follows for EnCore samplers
 - (1) EnCore samplers - 48 hours to preservation in two water-preserved vials and one methanol-preserved vial; 48 hours from preservation to freezing of low-level preserved vials; 14 days from collection to analysis of water-preserved or methanol-preserved vial
 - v) If field preservation will actually be left in the SAP, change the holding time for field-preserved vials as follows:
 - (1) Water-preserved vials - 48 hours to freezing; 14 days from collection to analysis
 - (2) Methanol-preserved vials - 14 days from collection to analysis
 - f) Matrix SS & SB, SVOCs - Clarify which preparation procedure (3540 or 3550) will be used for each matrix. There needs to be consistency in how the samples are extracted as there can be differences in the extraction efficiency of each method.
 - g) Matrix SS & SB, Pesticides/PCBs - Clarify which preparation procedure (3540 or 3550) will be used for each matrix. There needs to be consistency in how the samples are extracted as there can be differences in the extraction efficiency of each method.

- h) Matrix SS & SB, Perchlorate - Under Preservation Requirements, add the requirement to ensure there is headspace in the sample jar as per SW-846 method 6850.
- i) Matrix SS & SB, TPH-DRO:
 - i) Clarify that this is TPH-DRO since it does not cover GRO.
 - ii) Clarify which preparation procedure (3540, 3545, or 3550) will be used for each matrix. There needs to be consistency in how the samples are extracted as there can be differences in the extraction efficiency of each method.
 - iii) SOP CA-536 is listed on this Worksheet but was not included on Worksheet #23, which lists all SOPs. Clarify if this SOP will be used, and if so, add it to Worksheet #23.
- j) Matrix SS & SB, Metals - Clarify that this is metals and cyanide.
- k) Matrix SS & SB, pH - Change the SOP listed for pH analysis to CA-709. The SOP currently listed is for TOC.
- l) Matrix GW & AQ, VOCs - Add SOP CA-320 (5030) to the SOP References column.
- m) Matrix GW & AQ, SVOCs - Clarify which preparation procedure (3510 or 3520) will be used for each matrix. There needs to be consistency in how the samples are extracted as there can be differences in the extraction efficiency of each method.
- n) Matrix GW & AQ, Pesticides/PCBs
 - i) Clarify which preparation procedure (3510 or 3520) will be used for each matrix. There needs to be consistency in how the samples are extracted as there can be differences in the extraction efficiency of each method.
 - ii) The containers listed are (2) 1000 mL amber bottles. Confirm that there will be one extraction for pesticides and PCBs, as listed in this table. If there will be separate extractions for each analysis, (4) 1000 mL amber bottles will need to be collected.
- o) Matrix GW & AQ, Perchlorate
 - i) Under Preservation Requirements, add the requirement to ensure there is headspace in the sample jar as per SW-846 Method 6850.
 - ii) Section 8.2 of SW-846 Method 6850 requires that the samples be filtered using 0.2 μ m PTFE membrane filtration. Clarify whether or not this will be performed in the field and include under Preservation Requirements.
- p) Matrix GW & AQ, TPH-DRO - Clarify that this is TPH-DRO since it does not cover GRO.
- q) Matrix GW & AQ, Metals
 - i) Clarify that this is metals and cyanide.
 - ii) SOP CA-751 is listed on this Worksheet but was not included on Worksheet #23, which lists all SOPs. Clarify if this SOP will be used, and if so, add it to Worksheet #23.
 - iii) Add SOPs CA-773 (cyanide) and CA-615 (mercury) to the SOP Reference column.
- r) Matrix GW & AQ, Filtered Metals - Clarify why SW-846 6010 (SOP CA-608) is included. The analysis of filtered metals is being performed in conjunction with groundwater and surface water samples, which are utilizing SW-846 6020 only.

The analysis for filtered metals should be performed by the same technique as the total metals. In addition, according to Worksheet #23, SW-846 6010 (SOP CA-608) is associated with IDW samples only.

- s) Matrix GW & AQ, Wet Chemistry - Clarify why nitrate, nitrite, and sulfate are included in the holding time column. These analyses are not being performed on any samples in this SAP.
- t) Matrix LIQ, TCLP VOCs
 - i) Delete SOP CA-510 in the Analytical SOP Reference column; this is applicable to non-VOC TCLP according to Worksheet #23.
 - ii) Add SOP CA-209 (ZHE) to the Analytical SOP Reference column.
- u) Matrix, LIQ, TCLP SVOCs
 - i) Clarify which preparation procedure (3510 or 3520) will be used for this matrix. There needs to be consistency in how the samples are extracted as there can be differences in the extraction efficiency of each method.
 - ii) Add SOP CA-510 (1311) to the Analytical SOP Reference column.
- v) Matrix, LIQ, TCLP Pesticides
 - i) Clarify which preparation procedure (3510 or 3520) will be used for this matrix. There needs to be consistency in how the samples are extracted as there can be differences in the extraction efficiency of each method.
- w) Matrix, LIQ, TCLP Herbicides - Add SOP CA-510 (1311) to the Analytical SOP Reference column.
- x) Matrix, LIQ, TCLP Metals - Add SOP CA-510 (1311) to the Analytical SOP Reference column.

31) Worksheet #20: Field Quality Control Sample Summary Table

- a) The table was not completed properly as far as the No. of Sampling Locations. A footnote (#2) was included stating that samples collected at different depths at the same location would be counted as a separate sampling location but this was not performed. As a result, the No. of Sampling Locations will double for most sites where soil sampling is being performed due to the collection of both surface and subsurface samples. The following sites are affected and need to double the No. of Sampling Locations in most cases - SWMU 1, SWMU 2, SWMUs 6/7, SWMU 10, AOC G, PI-5, PI-8, PI-10, PAOC I, PAOC O, PAOC P, PAOC Q, and PAOC X.
- b) Based on comment #31a above, for each site and matrix, the number of field duplicates and MS/MSDs will have to be increased accordingly to be at the required frequency of one per 10 samples for field duplicates and one per 20 samples for MS/MSDs, as listed on Question #4 on Worksheet #11 and in Worksheet #12.
- c) Clarify how the equipment blanks for VOCs in solid matrices are being collected since these samples are being collected using an EnCore sampler. Due to the nature of VOC soil sampling, equipment blanks may not be required.
- d) As per Worksheet #12-8, add one matrix spike sample and one equipment blank for TOC analysis of each matrix at each site
- e) Put the soil wet chemistry analyses in separate rows due to the different QC requirements associated with each analysis.

- f) SWMU 1
 - i) Two sample locations are listed for the soil wet chemistry and grain size analyses. However, according to Worksheet#18, the wet chemistry analyses are only being performed at one sample location (subsurface soil, SO06). Clarify and update the worksheets accordingly to be consistent.
 - ii) Due to the nature of sampling, surface water should be listed separately from the solid sample matrices. The EnCore listed for VOCs does not apply to surface water and equipment blanks may not be required for any of the surface water analyses due to the nature of the sampling.
 - iii) One sample location is listed for the wet chemistry analyses of a solid sample and surface water sample in the ephemeral stream. However, according to Worksheet #18, none of these samples are being analyzed for these parameters. Clarify and update the worksheets accordingly to be consistent.
 - iv) Six groundwater sample locations are listed for most analyses. However, according to Worksheet #18, nine groundwater samples will be collected. Clarify and update the worksheets accordingly to be consistent.
 - v) One groundwater sample is listed for the wet chemistry analyses. However, according to Worksheet #18, at least eight locations will be submitted for these analyses. This may be increased to nine locations depending on the resolution of comment #29a (vii). Clarify and update the worksheets accordingly to be consistent.
- g) SWMU 2 - Please refer to comment #12c regarding the Analytical Group listed in this worksheet for the soil samples.
- h) Wells South of Camp Garcia
 - i) One groundwater sample is listed for the wet chemistry analyses. However, according to Worksheet #18, two locations will be submitted for these analyses. Clarify and update the worksheets accordingly to be consistent.
 - ii) Four equipment blanks and four trip blanks seems excessive for two groundwater samples. The number of QC samples here should be revisited.
- i) SWMU 6/7 - One soil sample is listed for the wet chemistry and grain size analyses. However, according to Worksheet #18, four locations will be submitted for these analyses. Clarify and update the worksheets accordingly to be consistent.
- j) SWMU 10 - One groundwater sample is listed for the wet chemistry analyses. However, according to Worksheet #18, five locations will be submitted for these analyses. Clarify and update the worksheets accordingly to be consistent.
- k) PI 4 - One groundwater sample is listed for the wet chemistry analyses. However, according to Worksheet #18, seven locations will be submitted for these analyses. Clarify and update the worksheets accordingly to be consistent.
- l) PI 7 - Two soil samples are listed for the wet chemistry and grain size analyses. However, according to Worksheet #18, only one location will be submitted for these analyses. Clarify and update the worksheets accordingly to be consistent.
- m) PI 6 - Four soil samples are listed for the PCB analyses. However, according to Worksheet #18, six locations will be submitted for this analysis. Clarify and update the worksheets accordingly to be consistent.

- 32) Worksheet #21, Project Sampling SOP References Table - The Comments column for the SOP in Attachment C-4 states "Not included in MQAPP." Include this comment for SOPs in Attachments C-1, C-2, C-3, and C-5 also.
- 33) Worksheet #22 - Field Equipment Calibration, Maintenance, Testing, and Inspection Table
- a) In the SOP Reference column, note MQAPP next to each SOP number so that the location of the SOP is easily located.
 - b) YSI pH probe - The table states the acceptance criterion is pH 4.0 \pm 3%. However, the referenced SOP C-1 requires the calibration to include two standards (pH 7 and one other standard). The acceptance criterion in SOP C-1 is \pm 0.2 standard units of the true value. The table must be updated to be consistent with the referenced SOP.
 - c) YSI Specific Conductance Probe - The table states the acceptance criterion is 4.49 \pm 3%. However, the referenced SOP C-1 requires the calibration to include a 1000 μ mhos standard. It is unclear what the 4.49 is referring to. The table must be updated to be consistent with the referenced SOP.
 - d) Hach Turbidity Probe
 - i) Clarify if this is a probe or meter. The Corrective Action column in this table refers to a "probe" but the referenced SOP C-1 refers to an instrument.
 - ii) The calibration acceptance criterion in this table is not in agreement with the referenced SOP. The table must be updated to be consistent with the referenced SOP.
 - e) YSI Dissolved Oxygen and Temperature Probes
 - i) The table states the acceptance criterion is to be consistent with the current atmospheric pressure and ambient temperature. However, the referenced SOP C-1 requires the calibration at 100% saturation with an acceptance criterion of \pm 0.3 mg/L DO. In addition, the table states that this calibration is performed daily before use but the referenced SOP C-1 states that this calibration should be performed prior to use as well as at the end of the day. The table must be updated to be consistent with the referenced SOP.
 - ii) As per the referenced SOP C-1, update the Inspection Activity column to include checking the sensor for bubbles and checking the membrane for wrinkles.
 - f) PID - As per the referenced SOP C-8, update the Calibration Frequency column to additionally include when erratic readings are observed and at the end of the day.
 - g) FID
 - i) As per the referenced SOP C-7, update the Calibration Frequency column to additionally include when erratic readings are observed and at the end of the day.
 - ii) As per the referenced SOP C-7, update the Acceptance Criteria column to additionally include the requirement for ambient air readings, similar to what is listed for the PID.
 - h) If ORP is going to be measured as part of the water quality parameters for groundwater or surface water, add this probe to Worksheet #22.
 - i) TPH Field Assay Kit

- i) Update the Maintenance Activity column to include recharging the battery prior to use and keeping the instrument out of sunlight when not in use.
- ii) Update the Calibration Frequency column to include a calibration check daily prior to use and after every 10 samples. In addition, as per the manufacturer, if the ambient temperature varies by more than ± 10 °C from the original calibration temperature, recalibration is required at the new temperature; add this requirement also to the Calibration Frequency column.
- iii) Change the SOP Reference column to C-1.

34) Worksheet #23: Analytical SOP References Table

- a) SOP CA-736 for ignitability is included on Worksheet #19; therefore, include it on this worksheet.
- b) Clarify if SOPs for SIM analysis (CA-213 and CA-220) are inclusive of all compounds being analyzed by SIM in these investigations. If not, the last column will need to be changed to “Y” with the modifications provided for each SOP.
- c) SOP CA-512 - Revise the Matrix and Analytical Group column to show SVOC instead of PEST/PCB.
- d) SOP CA-515 - Revise the Matrix and Analytical Group column to show GW, SW, and AQ in addition to IDW. If this is not appropriate, provide the applicable SOP for extraction of these matrices for pesticides and PCBs.
- e) SOPs CA-604 and CA-605 - The title of these SOPs indicates they are associated with preparation of samples for ICP-AES analysis. However, all samples are being analyzed by ICP/MS. Clarify if these SOPs are appropriate for preparation of samples for ICP/MS. If modifications will need to be made to accommodate ICP/MS, the last column will need to be changed to “Y” with the modifications provided for each SOP.
- f) SOP CA-627 - Should surface soil, subsurface soil and sediment be included in the applicable matrices? If not, provide the SOP appropriate for ICP/MS analysis of solid samples.
- g) SOP CA-709 - Should surface soil, subsurface soil and sediment be included in the applicable matrices? If not, provide the SOP appropriate for pH analysis of these solid matrices.
- h) Clarify where SOPs CA-722 and 739 will be used. If not being used, delete from this worksheet.
- i) Clarify what the asterisk indicates for SOPs CA-739, CA-741, CA-742, and CA-763.

35) Worksheet #24: Analytical Instrument Calibration Table

- a) There are references to footnotes (1) and (2) in the last two column headers. Define these footnotes at the bottom of the table.
- b) The following instruments were not included and must be added to the table
 - i) pH probe for SOP CA-709
 - ii) Ion chromatograph for chloride (SOP CA -742)
 - iii) Analytical balance for TDS (SOP CA-720)
- c) In some cases, the information provided in the first column labeled Instrument was not correct. Please change the following rows as follows:

- i) GC (TPH-DRO) and GC (TPH-GRO) - change to GC/FID
- ii) SW846 6010 - change to ICP-AES
- iii) SW846 6020 - change to ICP/MS
- iv) MS (Perchlorate) - change to LC/MS/MS
- d) The Calibration Procedure for LC/MS/MS (Perchlorate) is not correct. As per the method, add rows for Initial Calibration, CCV, and ICV.
- e) Frequency of Calibration column
 - i) Mercury - Calibration procedure refers to an ICV and CCV but the frequency of calibration column and corrective action column only discusses the CCV. Update all columns to be consistent.
 - ii) GC/ECD (8082) - The information in this column does not cover the frequency of calibration. Please update.
 - iii) LC/MS/MS (Perchlorate) - Update to include frequency of initial calibration, ICV (immediately after initial calibration), and CCV (prior to samples, every 10 samples, and at end of sequence), as per SW846 method 6850.
- f) Acceptance Criteria column
 - i) Mercury - Include the number of required calibration points.
 - ii) TOC - Include the number of required calibration points.
 - iii) VOC (8260)
 - (1) It is unclear if the criteria in the table are being used or if the criteria in Worksheet #24a are being used. Clarify and update, as necessary.
 - (2) Provide separate calibration criteria for the SIM analysis as the calibration criteria will be different from the Low method and not dependent on CCCs and SPCCs. There should be specific criteria for each compound being analyzed by SIM.
 - iv) SVOC (8270)
 - (1) It is unclear if the criteria in the table are being used or if the criteria in Worksheet #24c are being used. Clarify and update, as necessary.
 - (2) Provide separate calibration criteria for the SIM analysis as the calibration criteria will be different from the Low method and not dependent on CCCs and SPCCs. There should be specific criteria for each compound being analyzed by SIM.
 - v) GC/ECD (8082) - The information in this column does not cover the acceptance criteria. It appears that this information was inadvertently placed in the Frequency of Calibration column. Update as necessary.
 - vi) HPLC (Explosives) – Initial calibration acceptance criteria should be ≥ 0.990 .
 - vii) LC/MS/MS (Perchlorate) - Add acceptance criteria for initial calibration (6-points plus blank; $r \geq 0.995$), ICV ($\pm 15\%$), and CCV ($\pm 50\%$ for low-range standard and $\pm 15\%$ for mid-range standard), as per SW846 method 6850.
- g) Corrective Action column, LC/MS/MS (perchlorate) - Update this column to include specific corrective action for the initial calibration, ICV, and CCV. CCV corrective action should require reanalysis of samples not bracketed by acceptable CCV.
- h) SOP Reference column
 - i) VOC (8260) - Add SOP CA-220 which includes SIM.
 - ii) SVOC (8270) - Add SOP CA-213 which includes SIM.

- i) Delete Worksheet #24b; this is not applicable to calibrations. In addition, the header of this table is incorrect.
 - j) If Worksheet #24c is being used for calibration criteria of SVOCs (see comment #35 f(iv)(1)), update the header of this table to state Semivolatile instead of Volatile.
 - k) Delete Worksheet #24d; this is not applicable to calibrations. In addition, the header of this table is incorrect.
- 36) Worksheet #25: Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table
- a) SOP Reference column - As per the footnote #1, the SOP References should match the SOPs provided in Worksheet #23. This was not done as follows:
 - i) ICP-AES (metals) - Change from SOP CA-630 to CA-608.
 - ii) GC/ECD (pesticide) - Delete SOPs CA-340 and CA-341 and add SOP CA-329.
 - iii) GC/MS (VOC) - Delete SOP CA-225 and add SOPs CA-214 and CA-320.
 - iv) GC/MS (SVOC) - Delete SOP CA-224 and add SOP CA-213.
 - v) Mercury - Delete SOP CA-631 and add SOPs CA-611 and CA-615.
 - vi) ICP/MS - Change SOP CA-631 to CA-627.
 - b) Delete reference to metals after the Konelab instrument. This is for cyanide only.
 - c) Clarify what the Konelab Autosampler is for on page 280 and how this is different from the Konelab on page 279 using SOP CA-773. In addition, the Konelab Autosampler references SOP CA-751 which was not included on Worksheet #23. Clarification is required and worksheets need to be updated as needed to be consistent.
 - d) Combine the last two rows so there is only one row for the LC/MS/MS for perchlorate.
 - e) The following instruments were not included and must be added to the table:
 - i) Ion chromatograph for chloride (CA-742)
 - ii) Analytical balance for TDS (CA-720)
 - iii) pH meter (CA-709)
- 37) Worksheet #27: Sample Custody Requirements Table
- a) Sample Labeling - Tape should not be used on the aqueous VOC vials as the tape could interfere with the robotics of the autosampler. Add this exception to the text.
 - b) Sample Identification Procedures - Revise the text to clarify that the receiving clerk will check the pH values of water samples requiring preservative, with the exception of VOCs.
- 38) Worksheet #28: Laboratory QC Samples Table
- a) Worksheet #28-1: VOCs/solid matrices
 - i) Clarify why the method blank acceptance criteria is different than the trip and equipment blank acceptance criteria in Worksheet #12-1. Typically, these are all the same.

- ii) LCS Corrective action - Revise the last sentence to read, Otherwise, reprep and reanalyze the LCS and all associated samples.
- iii) Surrogates - The corrective action must be revised to reanalyze, regardless if still within holding time. Sometimes, a sample analyzed outside of holding time is of better quality than a sample with very low surrogate recoveries within holding time. Therefore, this must be revised.
- iv) Clarify why there is a SIM section on this worksheet. The corresponding Worksheet #12-1 did not have a SIM section. In addition, SIM is not included on any of the VOC-soil Worksheets #15 (15-1, 15-1a, and 15-1b). If SIM is being performed on soil samples for VOCs, specify which analytes and update Worksheets #15 and 12-1 accordingly. If the SIM section stays, the three comments listed above apply to this section also.
- v) Worksheet #28-1a
 - (1) Revise header to state Lab and Field QC Samples since this table is for LCS criteria also.
 - (2) The lower recovery acceptance limit for vinyl chloride at 16% is very low, especially at sites where chlorinated VOCs are the primary constituents of concern. A higher recovery in the LCS is required to ensure the reported accuracy of this compound.
- b) Worksheet #28-2: SVOCs/solid matrices
 - i) Clarify why the method blank acceptance criteria is different than the equipment blank acceptance criteria in Worksheet #12-2. Typically, these are all the same.
 - ii) Surrogates - The corrective action must be revised to reextract and reanalyze, regardless if still within holding time. Sometimes, a sample extracted outside of holding time is of better quality than a sample with very low surrogate recoveries within holding time. Therefore, this must be revised.
 - iii) LCS Corrective action - Revise the last sentence to read, Otherwise, reprep and reanalyze the LCS and all associated samples.
 - iv) The three comments listed above apply to the SIM section of this worksheet as well.
 - v) Worksheet #28-2a
 - (1) Revise header to state Lab and Field QC Samples since this table is for LCS criteria also.
 - (2) The lower recovery acceptance limits for indeno(1,2,3-cd)pyrene, dibenz(a,h)anthracene, and benzo(g,h,i)perylene via SIM are very low, especially at sites where PAHs are the primary constituents of concern. Higher recoveries in LCSs are required to ensure the reported accuracy of these compounds.
 - (3) Worksheets #15-2, 15-2a, and 15-2b show that additional compounds (hexachloroethane, 2-chloronaphthalene, hexachlorobenzene, carbazole, di-n-butylphthalate, and bis(2-ethylhexyl)phthalate) will also be analyzed by SIM. Add these compounds to Worksheet #28-2a or revise other worksheets accordingly.
- c) Worksheet #28-3: Pesticides & PCBs/solid matrices

- i) Add the Endrin/DDT breakdown check standard to the list of QC samples for pesticides.
- ii) LCS Corrective action (for pesticides and PCBs) - The last sentence must be revised to read, Otherwise, reextract LCS (not blank) and affected samples.
- iii) Worksheet #28-3a - Revise header to state Lab and Field QC Samples since this table is for LCS criteria also.
- d) Worksheet #28-4: Explosives/solid matrices
 - i) Change the SOP Reference in the header for perchlorate to BR-LC-004 (not BR-LC-003).
 - ii) LCS Corrective action for explosives and perchlorate - Revise the last sentence to read, Otherwise, reprep and reanalyze the LCS and all associated samples.
 - iii) Add the following QC Samples to the perchlorate section of the table:
 - (1) Conductivity Limit Standard - performed prior to analysis of samples; perchlorate must be between 80-120% of the true value and the internal standard must be $\pm 50\%$ of the ICV or CCV; corrective action is to decrease anion concentration in the TDS standard and reperform test; measure of Accuracy/Bias.
 - (2) Internal Standard (IRCS) - added to every sample and QC sample; area counts must be $\pm 50\%$ of the CCV; corrective action is to reanalyze sample; measure of Accuracy/Bias.
 - iv) Various acceptance limits for perchlorate QC samples refer to an MRL. This is the first mention in the SAP of this term. Define or use the same terminology used in previous worksheets.
 - v) The corrective action for the matrix spike and matrix spike duplicates for perchlorate should include a similar contingency as done for the explosives (i.e., if the LCS results are acceptable, apply "J" flag to results of the parent sample; if both the LCS and MS/MSD are unacceptable, reprep the samples and QC).
 - vi) Include RPD ≤ 15 for the acceptance limits for the perchlorate matrix spike duplicate.
 - vii) Clarify what the perchlorate LFB is and how it differs from the LCS.
- e) Worksheet #28-5: TPH-GRO & DRO/solid matrices, LCS Corrective action (TPH-DRO & GRO) - Revise the last sentence to read, Otherwise, reprep and reanalyze the LCS and all associated samples.
- f) Worksheet #28-6, Metals and cyanide/solid matrices
 - i) Preparation blank corrective action (metals, mercury, and cyanide) - Revise the last sentence to read, Otherwise, redigest the blank and the associated samples.
 - ii) LCS Corrective action (metals, mercury, and cyanide) - Revise the last sentence to read, Otherwise, redigest and reanalyze the LCS and all associated samples for the affected analyte.
 - iii) Metals - Add the Interference Check Sample and Calibration blanks to the list of QC Samples.
 - iv) Mercury - Add Calibration blanks to the list of QC Samples.
- g) Worksheet #28-8: Wet chemistry/solid matrices

- i) LCS Corrective action (TOC) - Revise the last sentence to read, Otherwise, reprep the LCS and all associated samples.
- ii) TOC Low-level calibration sample - the acceptance criteria provided are for the initial calibration curve, not for a low-level calibration sample. Please clarify.
- h) Worksheet #28-9: VOCs/aqueous matrices
 - i) Clarify why the method blank acceptance criteria are different than the trip and equipment blank acceptance criteria in Worksheet #12-9. Typically, these are all the same.
 - ii) LCS Corrective action (Low and SIM methods) - Revise the last sentence to read, Otherwise, reprep and reanalyze the LCS and all associated samples.
 - iii) Surrogates (Low and SIM methods) - The corrective action must be revised to reanalyze, regardless if still within holding time. Sometimes, a sample analyzed outside of holding time is of better quality than a sample with very low surrogate recoveries within holding time. Therefore, this must be revised.
 - iv) Worksheet #28-9a: Revise header to state Lab and Field QC Samples since this table is for LCS criteria also.
- i) Worksheet #28-10: SVOCs/aqueous matrices
 - i) Clarify why the method blank acceptance criteria for the Low method is different than the equipment blank acceptance criteria in Worksheet #12-10. Typically, these are all the same. Depending on the response to comment #38 i) iv) (3) below, this may also apply to the SIM method.
 - ii) Surrogates (Low and SIM methods) - The corrective action must be revised to reextract and reanalyze, regardless if still within holding time. Sometimes, a sample extracted outside of holding time is of better quality than a sample with very low surrogate recoveries within holding time. Therefore, this must be revised.
 - iii) LCS Corrective action (Low and SIM methods) - Revise the last sentence to read, Otherwise, reprep and reanalyze the LCS and all associated samples.
 - iv) Worksheet #28-10a
 - (1) Revise header to state Lab and Field QC Samples since this table is for LCS criteria also.
 - (2) The lower recovery acceptance limit of 0% for phenol is not acceptable. Based on the recovery limits of other phenols, the lower limit should be no lower than 30%; revise accordingly.
 - (3) Worksheets #15-10 and 15-10a show that additional compounds (hexachloroethane, 2-chloronaphthalene, hexachlorobenzene, carbazole, di-n-butylphthalate, and bis(2-ethylhexyl)phthalate) will also be analyzed by SIM. Add these compounds to Worksheet #28-10a or revise other worksheets accordingly.
- j) Worksheet #28-11: Pesticides & PCBs/aqueous matrices
 - i) Add the Endrin/DDT breakdown check standard to the list of QC samples for pesticides.
 - ii) LCS Corrective action (for pesticides and PCBs) - Revise the last sentence to read, Otherwise, reextract LCS (not blank) and affected samples.
 - iii) Worksheet #28-11a

- (1) Revise header to state Lab and Field QC Samples since this table is for LCS criteria also.
- (2) Include the surrogate recovery acceptance limits for the PCB analysis.
- k) Worksheet #28-12: Explosives/aqueous matrices
 - i) LCS Corrective action for explosives and perchlorate - Revise the last sentence to read, Otherwise, reprep and reanalyze the LCS and all associated samples.
 - ii) Add the following QC Samples to the perchlorate section of the table:
 - (1) Conductivity Limit Standard - performed prior to analysis of samples; perchlorate must be between 80-120% of the true value and the internal standard must be $\pm 50\%$ of the ICV or CCV; corrective action is to decrease anion concentration in the TDS standard and reperform test; measure of Accuracy/Bias.
 - (2) Internal Standard (IRCS) - added to every sample and QC sample; area counts must be $\pm 50\%$ of the CCV; corrective action is to reanalyze sample; measure of Accuracy/Bias.
 - iii) Various acceptance limits for perchlorate QC samples refer to an MRL. This is the first mention in the SAP of this term. Define or use the same terminology used in previous worksheets.
 - iv) The corrective action for the matrix spike and matrix spike duplicate for perchlorate should include a similar contingency as done for the explosives (i.e., if the LCS results are acceptable, apply "J" flag to results of the parent sample; if both the LCS and MS/MSD are unacceptable, reprep the samples and QC).
 - v) Include RPD ≤ 15 for the acceptance limits for the perchlorate matrix spike duplicate.
 - vi) Clarify what the perchlorate LFB is and how it differs from the LCS.
- l) Worksheet #28-13: TPH-GRO & DRO/aqueous matrices, LCS Corrective action (TPH-DRO & GRO) - Revise the last sentence to read, Otherwise, reprep and reanalyze the LCS and all associated samples.
- m) Worksheets #28-14 and 28-15: Metals and cyanide/aqueous matrices
 - i) Preparation blank corrective action (metals, mercury, and cyanide) - Revise the last sentence to read, Otherwise, redigest the blank and the associated samples.
 - ii) LCS Corrective action (metals, mercury, and cyanide) - Revise the last sentence to read, Otherwise, redigest and reanalyze the LCS and all associated samples for the affected analyte.
 - iii) Metals - Add the Interference Check Sample and Calibration blanks to the list of QC Samples.
 - iv) Mercury - Add Calibration blanks to the list of QC Samples.
- n) Worksheet #28-16: Wet chemistry/aqueous matrices
 - i) Chloride matrix spike recovery acceptance limits listed in this worksheet do not agree with the limits listed in Worksheet #12-16. Update the worksheets to be consistent.
 - ii) LCS Corrective action (TDS) - Revise the last sentence to read, Otherwise, reprep an LCS (not blank) and all associated samples.

- o) Worksheet #28-17: TCLP VOC
 - (1) Method blank - Delete reference to methylene chloride in the acceptance limits as this is not a TCLP VOC. However, allowances should be added for 2-butanone.
 - (2) According to Worksheet #12-17, matrix spikes are not applicable for these analyses. Clarify and revise worksheets to be consistent.
 - (3) LCS Corrective action - Revise the last sentence to read, Otherwise, reprep an LCS and all associated samples.
 - (4) Worksheet #28-17a: Revise header to state Lab and Field QC Samples since this table is for LCS criteria also.
- p) Worksheet #28-18: TCLP SVOC
 - (1) Method blank - Delete reference to phthalates as these are not TCLP SVOCs.
 - (2) Method blank - Last sentence of corrective action should end with "...reextract and reanalyze the associated samples." The reference to the holding time should be removed as it does not apply.
 - (3) LCS - Remove the reference to the holding time in this corrective action; it does not apply.
 - (4) Surrogates - Include the acceptance limits or include a reference to another worksheet for these limits.
 - (5) Internal standards - Corrective action should state "reanalysis of sample".
 - (6) Please explain what the low-level calibration standard is in this worksheet. This standard has not been required in any of the other SVOC worksheets and the acceptance criteria do not make sense.
 - (7) Worksheet #28-18a: Revise header to state Lab and Field QC Samples since this table is for LCS criteria also.
 - (8) According to Worksheet #12-18, matrix spikes are not applicable for these analyses. Clarify and revise worksheets to be consistent.
- q) Worksheet #28-19: TCLP Pesticides
 - (1) Add endrin breakdown standard to the list of QC samples.
 - (2) Provide the LCS and matrix spike acceptance limits as done in other worksheets.
 - (3) According to Worksheet #12-19, matrix spikes are not applicable for these analyses. Clarify and revise worksheets to be consistent.
 - (4) LCS Corrective action - Revise the last sentence to read, Otherwise, reextract an LCS and all associated samples.
- r) Worksheet #28-20: TCLP Herbicides
 - i) LCS Corrective action - Revise the last sentence to read, Otherwise, reprep an LCS and all associated samples.
 - ii) According to Worksheet #12-20, matrix spikes are not applicable for these analyses. Clarify and revise worksheets to be consistent.
- s) Worksheet #28-21: TCLP Metals
 - i) Preparation blank corrective action (metals, mercury) - Revise the last sentence to read, Otherwise, redigest the blank and the associated samples.

- ii) LCS Corrective action (metals, mercury) - Revise the last sentence to read, Otherwise, redigest and reanalyze the LCS and all associated samples for the affected analyte.
 - iii) Metals - Add the Interference Check Sample and Calibration blanks to the list of QC Samples.
 - iv) Mercury - Add Calibration blanks to the list of QC Samples.
 - v) According to Worksheet #12-21, matrix spikes are not applicable for these analyses. Clarify and revise worksheets to be consistent.
 - t) Worksheet #28-22: Reactivity
 - i) Nominal limits of 0-100% for the LCS are unacceptable. Provide limits that will allow some degree of accuracy for the reactive cyanide and sulfide analyses. 0% recovery is not sufficient for this purpose.
 - ii) According to Worksheet #12-22, matrix spikes are not applicable for these analyses. Clarify and revise worksheets to be consistent.
- 39) Worksheet #29: Project Documents and Records Table
- a) Add field data sheets (which are included in the sampling SOPs), decontamination records, and the TPH-field screening results to the list of documents.
 - b) The following items are not typically included in the full CLP-like data packages. Confirm with the proposed laboratories that this information will be provided. Otherwise, update this table.
 - i) Standard Traceability logs
 - ii) Equipment Maintenance, Testing, and Inspection Logs
 - iii) Data Package Completeness Checklists (these are typically provided by CLP labs but not routine commercial labs).
 - c) The Extraction/clean-up records are listed as being “maintained by the laboratory”. However, these are required to be included in the full data package.
- 40) Worksheet #30: Analytical Services Table - Update the number of Sample Locations to be consistent with Worksheet #20, which will be revised based on comment #31.
- 41) Worksheets #32-1 and 32-2 have the incorrect titles and need to be switched.
- 42) Worksheet #33: QA Management Reports Table - This table should also include Data Validation Reports and Data Usability Assessments.
- 43) Worksheet #34: Verification (Step I) Process Table - Brett Doerr is listed as the Project Manager in this worksheet. This worksheet needs to be consistent with Worksheets #3, 4, 5, 6, and 7. In these worksheets, Brett Doerr is referred to as the Environmental Manager and John Swenfurth is referred to as the Project Manager. Update worksheets to be consistent.
- 44) Worksheet # 36: Analytical Data Validation (Steps IIa and IIb) Summary Table
- a) The first two sentences listed in the metals validation criteria apply to all methods. Either add these sentences to all of the other methods or include a generic footnote at the bottom of the table for all methods.

- b) Explosives - The referenced SOP is outdated; Region 2 has a new SOP for validation of explosives data (SOP HW-16, Nitroaromatics and Nitroamines by HPLC, Rev. 2, September 2006). Include the most current version in this table.
 - c) Pesticides/PCBs - The referenced Region 2 SOP (HW-23) is obsolete. Region 2 has two new SOPs available for the validation of pesticide and PCB data; HW-44 and HW-45, both from October 2006. Include the most current versions in this table.
 - d) SVOCs - The referenced Region 2 SOP (HW-22) is outdated; the newest version is Revision 3, dated October 2006. Include the most current version in this table.
 - e) VOCs - The referenced Region 2 SOP (HW-24) is outdated; the newest version is Revision 2, dated October 2006. Include the most current version in this table.
- 45) Worksheet # 37: Usability Assessment
- a) Please clarify where in the SI/Expanded SI report the results of the review to determine if the dataset is spatially adequate for making project-specific determinations will be presented, as discussed in paragraph 4 of this section.
- 46) References - Ensure that the correct versions of the Region 2 SOPs, as per comment #44, are included in this section.
- 47) Sections 3.5.3, 3.5.4, and 3.5.5 of the UFP QAPPs Manual were not addressed in this SAP. Provide this information (data reporting formats, data handling and management procedures, data tracking and control procedures).
- 48) Figure 3 - This figure should include SWMU 4.
- 49) Figure 22 - The figure should call out the location of the former PCB storage pad and sump since two proposed sample locations are based on these items.
- 50) Figure 27 – See comment #19a.
- 51) Figure 51 - For the table in the top left corner of the figure which summarizes screening criteria, delete the row that spells trichloroethene incorrectly. In addition, correct the spelling of trichloroethene for well EPAL-MW01.