

5090
Ser 1832.3/6075
January 11, 1996

From: Commanding Officer, Engineering Field Activity, West, Naval Facilities Engineering
Command
To: Distribution

Subj: SUBMISSION OF THE RESPONSES TO AGENCIES' COMMENTS ON THE IR-3
TREATABILITY STUDY, ENGINEERING FIELD ACTIVITY, WEST, NAVAL
FACILITIES ENGINEERING COMMAND, HUNTERS POINT ANNEX, SAN
FRANCISCO, CALIFORNIA

Encl: (1) Navy Responses to Agency Comments on the Draft Final Treatability Study Work
Plan for Treating Subsurface Petroleum Products at Site IR-3 by Biodegradation

1. Enclosure (1) is forwarded for your information. An engineering evaluation/cost analysis (EE/CA) for a non-time-critical removal action at IR-3, which is scheduled for this year pending availability of fund, will evaluate this technology along with others. If this technology is selected as the most favorable alternative, a final work plan will be issued.

2. If you have any questions, the point of contact is Mr. Dave Song at (415) 244-2561.

Original signed by:

RICHARD E. POWELL
By direction of
the Commanding Officer

Distribution:

U.S. Environmental Protection Agency (Attn: Sheryl Lauth)
U.S. Environmental Protection Agency (Attn: Claire Trombadore)
Roy F. Weston, Inc. (Attn: Karla Brasaemle)
California Department of Toxic Substances Control (Attn: Cyrus Shabahari)
California Regional Water Quality Control Board (Attn: Richard Hiatt)
San Francisco City Attorney (Attn: John Cooper)
City and County of San Francisco Dept. of Public Health, Bureau of Toxics
(Attn: Amy Brownell)
National Oceanic & Atmospheric Administration (Attn: Laurie Sullivan)
U.S. Department of the Interior (Attn: Nancy Goodson)
U.S. Fish & Wildlife (Attn: Jim Haas)

California Department of Fish & Game (Attn: Mike Martin)
California Office of Environmental Health (Attn: Margy Gassel)
California Department of Health Services (Attn: Alyce Ujihara)
Bay Area Air Quality Management District (Attn: Catherine Fortney)
NAVBASE San Francisco (Bay Area Base Transition Coordinator, Attn: CDR Al Elkins)
RAB Member: ARC Ecology (Attn: Saul Bloom)

cc:

Harding Lawson Associates (Attn: David Leland)

Blind Copy to:

62.3, 1832, 1832.1, 1832.2, 1832.3, 09CMN

Admin Records (3 Copies, w/encl)

Chron, blue, pink, green

File: HPA

**NAVY RESPONSES TO AGENCY COMMENTS
ON THE DRAFT FINAL TREATABILITY STUDY WORK PLAN
FOR TREATING SUBSURFACE PETROLEUM PRODUCTS AT SITE IR-3 BY
BIODEGRADATION**

The U.S. Environmental Protection Agency (EPA), California Environmental Protection Agency (Cal/EPA) Department of Toxic Substances Control (DTSC), and the California Regional Water Quality Control Board (RWQCB) provided comments on the draft final Treatability Study Work Plan for Treating Subsurface Petroleum Products at Site IR-3 by Biodegradation (TSWP). The TSWP was submitted by Mr. David Song of Naval Facilities Engineering Command, Engineering Field Activity West (EFA WEST), for the Hunters Point Annex (HPA) in San Francisco, California. EPA comments are presented in a letter dated October 2, 1995, from Ms. Sheryl Lauth to Mr. Song. RWQCB presented its comments in a letter dated August 29, 1995, from Mr. Richard Hiatt to Mr. Cyrus Shabahari of DTSC; the RWQCB comments were then forwarded to Mr. Song on August 31, 1995. Comments from EPA and RWQCB are presented below verbatim in bold text followed by the Navy's responses.

The Navy is not submitting a revised TSWP at this time because under the removal action documentation task order [contract task order (CTO) No. 007], the Navy proposes conducting a non-time-critical removal action at Site IR-3. As part of the removal action documentation, the Navy will conduct an engineering evaluation and cost analysis (EE/CA) to evaluate several cleanup alternatives against three criteria: effectiveness, implementability, and cost. If biodegradation appears to be a favorable alternative, based on the EE/CA, the TSWP will be revised and resubmitted at that time. If biodegradation is not a favorable alternative, the TSWP will not be revised.

RESPONSES TO COMMENTS FROM EPA

General Comments

1. **Comment:** Explain how high and low TPH concentration soils will be distinguished for the respirometry and solid phase treatability testing. Because it was stated that these treatability samples cannot be stored for more than 48 hours before they are unsuitable for biodegradation testing, it is assumed that resampling for both of these treatability tests must be performed.

As stated in the SAP, all excavations will be backfilled after initial soil characterization sampling. It was also stated that data from the initial soil characterization sampling will be used to determine high and low TPH concentration soil samples. However, re-excavation at the same location of the high and low TPH hits will not provide similar soil. Because these locations have been backfilled, the soil has also been vertically and horizontally mixed.

- Response:** High and low total petroleum hydrocarbons as diesel (TPH-d) concentrations will be determined based on (1) previous analytical data and (2) documented research

that indicates the highest concentrations of TPH-d will be in the capillary fringe above the water table. Groundwater at IR-3 is encountered at about 6 feet below ground surface (bgs); therefore, the capillary fringe and the highest TPH-d concentrations will be detected in samples collected from between 3 and 6 feet bgs. Samples collected above 3 feet bgs will be considered low TPH-d samples.

As shown on Plate 1-5 of the TSWP, three distinct 1-week sampling events will occur, one event each for the soil characterization (Task 1), the respirometry test (Task 4), and the solid-phase land treatment simulation (Task 7). The sampling events for Tasks 1 and 4 will be combined to collect samples at the same time, leaving two separate sampling events, one event for Tasks 1 and 4 and one event for Task 7. To prevent vertical mixing of the soil, the Navy proposes two techniques: (1) excavation will be conducted in lifts, soil will be stockpiled separately, and as the lifts are replaced, visqueen will be placed between the soil layers; or (2) the same grid will be used for both sampling events, and during the second sampling event, the excavation will be shifted 2 feet from the original excavation. All soil sampling will be conducted in the grid locations corresponding to random points 1, 2, and 3 as indicated in Table A-2 (see page A-7 of the TSWP).

2. Comment: Please clarify the analytical tests that will be performed at the start of each treatability tests, respirometry and solid phase treatment.

Response: Samples of the homogenized starting material for both respirometry and solid-phase treatability tests will be analyzed for the chemical, physical, and biological parameters listed in Table A-3 (see page A-9 of the TSWP).

3. Comment: The procedures to collect the treatability soil samples can be optimized to reduce the amount of sampling required, while still keeping the quality control and assurance.

Response: To optimize sample collection, soil characterization sampling and respirometry sampling events will be scheduled to occur at the same time.

SPECIFIC COMMENTS

1. Comment: Plate 1-2. Two borings (IR02MW173 and IR02B098) are shown with floating product and no soil contamination. This is unlikely because floating product is normally smeared onto soil when the water table fluctuates. Please correct. Also, please state that borings are projected into the line of section or correct the "lines of cross section" on Plate 1-4.

Response: Plate 1-2 was drawn conservatively with limited extrapolation between borings; therefore, some unobserved contaminated soil areas between borings were not inferred.

The second entry of the Plate 1-2 legend indicates that borings are projected into the line of cross-section by presenting the boring or well number with the distance and direction that the boring lies from the cross-section line indicated in parentheses.

2. **Comment:** **Section 4.0: Page 7, 1st paragraph. The objective of the treatability study should be expanded to include providing performance criteria for a full scale system should the technology be deemed applicable for remediation of the site.**

Response: If the EE/CA evaluates bioremediation as favorable, the TSWP will be revised to include a task to provide performance criteria for a full-scale system.

3. **Comment:** **Section 4.0: Page 7, 2nd paragraph. Explain what is meant by high mobility. High mobility in soil or water? For which contaminants?**

Response: Paragraph 2 on page 7 lists the characteristics of TPH-d that make it a reasonable indicator compound for this treatability study. One characteristic of TPH-d is that it has a relatively higher mobility in soil than do heavier fractions of TPH, such as waste oil.

4. **Comment:** **Section 4.0: Page 7, last sentence. Provide the rationale or reference for selecting a TPH-d concentration of 1,000 mg/kg as the target value and indicator of successful biodegradation. Further, it would seem that establishing a percentage of the initial sample concentration may be a more appropriate guideline for evaluating the effectiveness of bioremediation.**

Response: Based on the geologic characteristics of HPA, the State Water Resources Control board (SWRCB) "Leaking Underground Fuel Tank" Manual, dated October 1989, recommends 1,000 milligrams per kilograms (mg/kg) as the concentration of TPH-d that can be left in place without threatening groundwater.

Percent efficiency will be calculated as part of the treatability study evaluation; however, although efficiency may be high, if the TPH-d concentration after treatment is above the recommended level (1,000 mg/kg), the treatment will not be considered successful.

5. **Comment:** **Section 4.0: Page 10. This objective should be expanded to include VOC monitoring to assess the fraction of volatilization and anticipated impacts on air quality during full scale implementation.**

Response: If the EE/CA evaluates bioremediation as favorable, the TSWP will be revised to include monitoring and assessment of volatile organic compounds (VOC).

6. **Comment:** **Section 5.0: Pages 11 & 12. Describe the in-house methods for performing field moisture holding capacity and plate counts.**

- Response:** The in-house methods refer to Ecova Corporation (Ecova) methods. If the EE/CA evaluates bioremediation as favorable, the TSWP will be revised to include these methods.
- 7. Comment:** **Section 5.0: Page 14, Task 5, "Theory of Respirometry."** Please provide an equipment description and applicable schematics for the N-CON respirometer.
- Response:** If the EE/CA evaluates bioremediation as favorable, the TSWP will be revised to include equipment descriptions.
- 8. Comment:** **Section 5.0: Page 16, Task 5 "Respirometry Task Description," 1st paragraph, 3rd sentence.** It is implied, but not fully explained that for the sterile control samples, mercuric chloride will be added to kill all the biological organisms in the soil. Please explain further.
- Response:** If the EE/CA evaluates bioremediation as favorable, the TSWP will be revised to state that mercuric chloride will be added to kill all biological organisms in soil. Therefore, any oxygen uptake by the sterile control samples would result from chemical interactions with the soil slurry and not from biological activity.
- 9. Comment:** **Section 5.0: Page 17, Task 8 "Solid Phase/Land Treatment Simulation".** As indicated in Specific Comment number 4 above, this task should be expanded to include an evaluation of volatilization and predicted impacts on the air quality during full scale implementation. Unlike the slurry phase respirometry test (task 5), solid phase land treatment is not anticipated to occur within an enclosed system, and would therefore impart VOCs to the atmosphere. Such data would assist in determining the air emissions for future permitting should the process be used in full scale implementation.
- Response:** If the EE/CA evaluates bioremediation as favorable, the TSWP will be revised to include VOC monitoring and assessment.
- 10. Comment:** **Section 5.0: Page 18, Task 8 "Solid Phase/Land Treatment Simulation," 2nd paragraph, 2nd sentence.** This sentence implies that high and low TPH concentration soils, will be sampled at the sample grid locations where the respiratory samples were taken. Is this correct?
- Response:** As described in the response to General Comment 1, all sampling events will use the same grid locations.
- 11. Comment:** **Section 5.0: Page 18, Task 8 "Solid Phase/Land Treatment Simulation," 2nd paragraph, table.** Explain why control samples with low moisture content will not be prepared. Also, the number of trays needed to test in duplicate appears to be 12, which is inconsistent with the statement on page 10 that 24 pans will be used. Please correct or explain.

Response: If the EE/CA evaluates bioremediation as favorable, the TSWP will be revised to include low-moisture control samples. The TSWP will also be revised to correct page 10 to read "18 pans" instead of "24 pans." Additional text will be revised or added to indicate that the treatability study will be conducted in triplicate instead of duplicate, as currently indicated on page 18.

12. Comment: Section 5.0: Page 19, Task 8 "Solid Phase/Land Treatment Simulation," 1st paragraph, 3rd full sentence. This sentence seems to state that water will be added to the pan in an equal amount to the removed aliquots.

Response: If the EE/CA evaluates bioremediation as favorable, the TSWP will be revised to clearly state that water is added to the sample, not to the pans.

EPA COMMENTS ON APPENDIX A: SAMPLING AND ANALYSIS PLAN

1. Comment: Section 2.0: Page A-1, 3rd paragraph, 1st sentence. Please correct this sentence: "Samples collected from the will be homogenized..."

Response: If the EE/CA evaluates bioremediation as favorable, the first sentence of the third paragraph on page A-1 of the TSWP will be revised as follows: "Soil samples collected from the oil ponds will be homogenized . . ."

2. Comment: Section 3.0, Page A-3, 3rd paragraph. The text implies that each lift will be treated as an independent stratum. However, Table A-1 on page A-5 suggests that the 2-foot lift does not fit the definition of a stratum since it is heterogeneous; i.e., the standard deviation of the measurements is greater than the mean concentration.

Response: The lifts are not meant to be considered stratum. The oil ponds were divided horizontally to allow additional samples to be collected using the two-dimensional random sampling method.

3. Comment: Section 3.0, Page A-5, Eqn. 1. The text is unclear as to the purpose of estimating the sample requirements. Indicate if the purpose is to compare results for each stratum to a regulatory standard or to determine (via a treatability study) if contaminant concentrations are decreasing as a result of treatment.

If the purpose is to determine if results are less than a regulatory limit, the Δ in Equation 1 is the smallest difference needed to be able to distinguish from the standard at a preset confidence level. For example, if the limit is 1,000 mg/kg what concentration is statistically less than 1,000 (990, 900, etc.)? If the mean concentrations in Table A-1 are realistic, the approach is acceptable. However, if the difference between the 1,000 mg/kg limit and sample average (assuming the same standard deviation) is less than that used to calculate

number of samples, the average concentration cannot be stated to be less than 1,000 mg/kg.

If the purpose is to determine if concentrations are decreasing over time due to treatment, a much smaller difference must be distinguished and significantly more samples would be required.

Response: If the EE/CA evaluates bioremediation as favorable, the TSWP will be revised to clearly state the purpose of Equation 1 on Page A-5.

4. Comment: Section 5.1.1, Page A-6, item 7. If the treatability study samples are collected in 1-gallon buckets, then to collect enough for just the solid phase treatability test, 24 pans of 0.5 cubic feet each, approximately 90 buckets will need to be collected.

$$\begin{aligned} \# \text{ of buckets} &= (24 \text{ pans} \times 0.5 \text{ cubic feet/pan}) / (1 \text{ gallon} \times 0.13368 \text{ cubic} \\ &\quad \text{feet/gallon}) \\ &= 90 \text{ gallon buckets} \end{aligned}$$

If the soil is composited, then additional amounts will be required. This procedure should be re-examined to optimize this process, unless justification can be given for this particular procedure.

Response: If the EE/CA evaluates bioremediation as favorable, the TSWP will be revised to optimize the objectives and requirements of Task 8.

5. Comment: Section 5.1.1, page A-7, Table A-2. Specifically describe how grid locations were selected.

Response: The grid locations were selected using a random number generator.

6. Comment: Section 5.1.1, page A-7, Table A-2. Table A-2 implies that three samples will be sufficient to estimate the average concentration for each of the strata and be able to determine that results are statistically different from a value of 1,000 mg/kg at the 90% confidence level. This assumption is valid only if the average concentrations and standard deviations found are no larger than those presented in Table A-1.

Response: Ecova assumes that average concentrations and standard deviations found are no larger than those presented in Table A-1. Equation 1 is used to calculate the number of samples needed to estimate the average contaminant concentration.

7. Comment: Section 5.1.2, Page A-9. It is stated that soil will be composited and homogenized prior to treatability study testing. Indicate if site soils would be homogenized prior to actual treatment. If not, studies using a range of concentration conditions would be more appropriate.

Response: Based on treatability study results, soils at IR-3 may be mixed with bulking agents (such as wood chips) or with other soils to adjust the contaminant level to be compatible with bioremediation. The solid-phase bioremediation method involves tilling and mixing soil to aerate the soil and distribute the microbes; as a result, compositing soil during the treatability study should approximate conditions anticipated during full-scale operation.

8. Comment: **Section 5.1.2, Page A-9. It is unclear how the high level and low level TPH concentration soil samples for the respirometry and solid phase treatability test will be collected, and how the concentration levels will be determined.**

Response: Treatability study samples will be collected using the cone and quarter method described on page A-8 of the TSWP. Based on previous analytical results and information obtained from boring logs, the TPH-d concentration will be determined using knowledge of the depth of contamination. High TPH-d concentrations will be expected in samples collected from between 3 and 6 feet bgs. Samples collected above 3 feet bgs will be considered low TPH-d samples.

9. Comment: **Section 5.3, Page A-10, Item 5. Based on its boiling point and vapor pressure, isopropyl alcohol is unlikely to evaporate within a reasonable time period.**

Response: During decontamination, the "isopropyl alcohol rinse" will actually be administered by a spray bottle. The amount of alcohol runoff collected in a pan will be minimal and will most likely evaporate in a reasonable time period.

EPA COMMENTS ON APPENDIX C: QUALITY ASSURANCE PROJECT PLAN

1. Comment: **Section 4.2, Page C-6. Include copies of the laboratory Quality Assurance Manuals as an Appendix.**

Response: If the EE/CA evaluates bioremediation as favorable, the TSWP will be revised to include the Southwest Laboratory of Oklahoma Quality Assurance Manual. A subcontract laboratory with similar qualifications may be selected for some IR-3 analytical work.

2. Comment: **Section 6.1, Page C-9. Include standard operating procedures (SOP) for all non-standard or in-house analytical methods.**

Response: All moisture tests will be performed in accordance with the protocols specified in Subtask 4.9 of the PRC Statement of Work for Laboratory Analyses (PRC SOW), and microbiological tests will be performed in accordance with Standard Method 9215. If the EE/CA evaluates bioremediation as favorable, the TSWP will be revised to include the PRC SOW and Standard Method 9215.

3. Comment: **Section 6.1, Page C-10, Table C-1. Specify all individual analytes for complete carbon range and metals analyses. Specify reporting limits for all analytes.**

Response: Target analyte lists and reporting limits for the standard analytical methodologies specified in Table C-1 of the TSWP are provided in Section 7 of the proposed update to the HPA Basewide Quality Assurance Project Plan (QAPjP) and Table III-A-1 of the PRC SOW. Reporting limits for microbiological methodologies will be specified before samples are analyzed by the subcontractor performing the tests. If the EE/CA evaluates bioremediation as favorable, the TSWP will be revised to refer to Section 7 of the HPA Basewide QAPjP and the PRC SOW.

4. Comment: **Section 7.0, Page C-9. While the laboratory should review data to determine if QC criteria were achieved, data validation must be performed by an individual or group independent from the laboratory. There is an inherent conflict of interest in having laboratory personnel validate their own laboratory's data.**

Response: Section 10.3.2 of the proposed update to the HPA Basewide QAPjP discusses the difference between laboratory data validation procedures and project data validation procedures. Laboratory personnel will assess data at the time of analysis and reporting by reviewing raw data according to procedures described in the laboratory's quality assurance (QA) plan. HPA project personnel will oversee a complete validation of laboratory data according to EPA protocols; the validation will be performed by a subcontractor independent from the laboratory. If the EE/CA evaluates bioremediation as favorable, the TSWP will be revised to refer to Section 10.3.2 of the HPA Basewide QAPjP.

5. Comment: **Section 7.1, Page C-11. Specifically state how data reduction will be performed. EPA methods (other than CLP) generally do not specify how data reduction is to be done.**

Response: Sections 10.1 and 10.2 of the proposed update to the HPA Basewide QAPjP and Tasks 6 and 7 of the PRC SOW discuss data reduction and reporting procedures. If the EE/CA evaluates bioremediation as favorable, the TSWP will be revised to refer to Sections 10.1 and 10.2 of the HPA Basewide QAPjP and the PRC SOW.

6. Comment: **Section 7.3, Page C-11. Specify how data validation will be performed and what criteria will be used to qualify data. CLP guidelines are not appropriate since CLP QC criteria are specific only to CLP methods.**

Response: Section 10.3 of the proposed update to the HPA Basewide QAPjP discusses data validation performance and qualification criteria. If the EE/CA evaluates bioremediation as favorable, the TSWP will be revised to refer to Section 10.3 of the HPA Basewide QAPjP.

7. Comment: **Section 8.0, Page C-12. Specify QC criteria and actions to be taken if criteria are not achieved for all field and laboratory QC samples listed in this section.**

Response: Tasks 2, 3, and 4 of the PRC SOW discuss QC criteria and actions to be taken if criteria are not met for field and laboratory QC samples.

8. **Comment:** Section 9.1.1, Page C-16. Include a copy of the audit checklist to be used.

Response: If the EE/CA evaluates bioremediation as favorable, the TSWP will be revised to include a facility systems audit checklist.

9. **Comment:** Section 9.1.2, Page C-16. It is stated that a laboratory audit will be performed. Specify who will perform the audit, audit frequency, and include a copy of the audit checklist to be used.

Response: Section 11 of the proposed update to the HPA Basewide QAPjP discusses audit procedures and frequencies. If the EE/CA evaluates bioremediation as favorable, the TSWP will be revised to refer to Section 11 of the HPA Basewide QAPjP and an example laboratory audit checklist.

10. **Comment:** Section 9.2, Page C-17. Indicate how the contractor's QA/QC Coordinator will obtain system check sample results in a timely manner to ensure performance is acceptable.

Response: The QA/QC coordinator will obtain results from the most current round of performance audit samples from the EPA Contract Laboratory Program (CLP) before the start of the project. The QA/QC coordinator will also obtain results from performance audit samples analyzed during the course of the project as they become available.

11. **Comment:** General comment. As a part of our data quality oversight program, U.S. EPA intends to perform a routine audit on the samples analyzed for the IR-3 Treatability Study. We therefore request that the Navy provide to us the GC/MS magnetic data tapes for all analyses performed on samples collected and shipped over a four or five concurrent days during the treatability study field effort. The specific days of sampling should not be selected by the laboratory, but by the U.S. EPA in conjunction with the Navy. In addition, we request that the Navy send performance evaluation samples to the laboratory. EPA can assist the Navy in this process, if needed.

Response: The Navy will coordinate with its subcontractors to provide GC/MS magnetic data tapes as requested, with the assistance of EPA. In addition, the Navy or its subcontractor will oversee the laboratory submission of project-specific performance evaluation samples.

RESPONSE TO COMMENTS FROM CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD COMMENTS AND NAVY RESPONSES

General Comments

1. **Comment:** It is not appropriate to consider vadose zone soil bioremediation when LNAPLs have not been removed. Product recovery by pumping done in 1990 appeared

to be ineffective. However, other best available technologies such as bioslurping and vacuum-enhanced product recovery should be evaluated and implemented prior to soil bioremediation. These BATs are intended to overcome problems encountered in recovering viscous LNAPL in fine grain materials.

Response: If the EE/CA evaluates bioremediation as favorable, the TSWP will be revised to include a discussion of reducing light nonaqueous phase liquids (LNAPL) before excavation and bioremediation.

2. Comment: It is not appropriate to use soil slurry (15% solids) in the respirometry study because it is not relevant to what would be done in the field since "Slurry phase bioreactor treatment. . . was rejected as too expensive for full scale treatment of the soil from IR-3".

Response: This comment and Specific Comments 5 and 6 below state that using a soil slurry (15 percent solids) is inappropriate in the respirometry study because pilot-scale results are not applicable to full-scale solid-phase land treatment. The soil slurry method is anticipated to provide the most favorable environment for bioremediation. The results should provide a measure of the maximum attainable performance and minimum residual contaminant to be expected. The soil slurry results will be used to assess whether bioremediation is capable of attaining the remedial objectives. If the EE/CA evaluates bioremediation as favorable, the TSWP will be revised to clarify the tests objectives.

3. Comment: There are substantive ARARs in Chapter 15, Title 23, California Code of Regulations for construction, monitoring, operation and closure of a land treatment unit where the solid phase bioremediation will be implemented. Compliance with ARARs will have to be addressed prior to full scale operation. Depending upon the scale and duration of the pilot test, compliance with ARARs may also need to be addressed to the extent feasible.

Response: If the EE/CA evaluates bioremediation as favorable, the EE/CA report will include a discussion of compliance with ARARS.

4. Comment: Other similar or enhanced bioremediation technologies should be evaluated concurrently during the treatability study to expedite selection of the most effective way to bioremediate IR-3 soil. Thermal treatment and soil washing are two other alternatives to the solid-phase bioremediation that can be used to lower the high soil concentrations at IR-3 to levels that are amenable to bioremediation. Given this study was first proposed more than two years ago and a lot has been invested into this effort, the incremental benefit associated with adding other alternatives for evaluation in this study should justify the incremental cost.

Response: The proposed EE/CA will evaluate bioremediation, enhanced bioremediation, as well as other remediation technologies.

Specific Comments

5. Comment: Page 15, **Respirometry Task Description**, 2nd paragraph, 3rd sentence - It is not appropriate to use soil slurry (15% solids) in the respirometer study because it is not relevant to what would be done in the field since "Slurry phase bioreactor treatment. . .was rejected as too expensive for full scale treatment of the soil from IR-3". Respirometry test should be done to best simulate future treatment conditions to provide useful information to evaluate the effectiveness of bioremediation.

Response: This comment is addressed in the response to RWQCB General Comment 2.

6. Comment: Page 16, **Respirometry Test Description**, 4th paragraph - "Since a slurry system is the most efficient bioremediation system, ...the residual levels achieved here could potentially be used to determine the performance level for the site." Please see comment #5.

Response: This comment is addressed in the response to RWQCB General Comment 2.

7. Comment: Page A-3, **3.0 SAMPLE LOCATION AND FREQUENCY** - Soil samples are proposed to be taken at 2, 4 and 6 feet at 3 randomly selected locations in the North Pond and in the South Pond for characterization and treatability study. This would represent the moderately contaminated soil in the backfill of the ponds. Based on Plate 1-4 (Maximum TPHd and TOG Concentrations in Soil), the soil at 6 feet and below at some locations is either equally or more contaminated than the soil within the top 6 feet. The usefulness of the treatability results may be limited if you do not target the most contaminated soil.

Response: The treatability study was intended to be implemented as an interim action for the vadose zone; as a result, it only addresses contamination to 6 feet bgs. The proposed EE/CA will address soil above and below 6 feet. The sampling strategy will be revised to reflect the approach proposed in the EE/CA report.