Final

Sampling and Analysis Plan Amendment No. 1 Phase II Remedial Investigation IRP Site 1

FORMER MARINE CORPS AIR STATION EL TORO, CALIFORNIA

December 2004

Base Realignment and Closure
Program Management Office West
1230 Columbia Street, Suite 1100
San Diego, CA 92101

Comprehensive Long-Term Environmental Action Navy
Contract Number N62742-94-D-0048, CTO 0072

Final
Sampling and Analysis Plan Amendment No. 1
Phase II Remedial Investigation
IRP Site 1, Explosive Ordnance Disposal Range
Former MCAS El Toro, California

Contract No. N62742-94-D-0048
Contract Task Order No. 0072

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DOCUMENT TRANSMITTAL

Contract No. N62742-94-D-0048

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DATE: December 10, 2004
CTO #: 072
LOCATION: MCAS, El Toro

FROM: Hsien W. Chen

DESCRIPTION: Final Sampling and Analysis Plan Amendment No. 1, Phase II Remedial Investigation, IRP Site 1, Former Marine Corps Air Station, El Toro, California

TYPE: _____ Contract Deliverable (Cost) ___✓___ CTO Deliverable (Technical) _____ Other

VERSION: _____ REVISION #s: _____

ADMIN RECORD: Yes _____ No _____ Category _____ Confidential _____
(PM to Identify)

NUMBER OF COPIES SUBMITTED: 2/2/17C/5E

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FINAL WORK PLAN
PHASE II REMEDIAL INVESTIGATON IRP SITE, EXPLOSIVE ORDNANCE DISPOSAL RANGE

DATED 27 NOVEMBER 2001

IS ENTERED IN THE DATABASE AND FILED AT ADMINISTRATIVE RECORD NO. **M60050.002577**

AMENDMENT NO.1
TO THE WORK PLAN
PHASE II REMEDIAL INVESTIGATON IRP SITE EXPLOSIVE ORDNANCE DISPOSAL RANGE

DATED 21 NOVEMBER 2002

IS ENTERED IN THE DATABASE AND FILED AT ADMINISTRATIVE RECORD NO. **M60050.002868**

DRAFT FINAL
SAMPLING AND ANALYSIS PLAN
AMENDMENT NO.1 - PHASE II
REMEDIAL INVESTIGATON IRP SITE
EXPLOSIVE ORDNANCE DISPOSAL RANGE

DATED 3 MARCH 2004

IS ENTERED IN THE DATABASE AND FILED AT
ADMINISTRATIVE RECORD NO. **M60050.003051**

AMENDMENT NO. 2
TO THE WORK PLAN
PHASE II REMEDIAL INVESTIGATION IRP SITE,
EXPLOSIVE ORDNANCE DISPOSAL RANGE

DATED 4 DECEMBER 2002

IS ENTERED IN THE DATABASE AND FILED AT
ADMINISTRATIVE RECORD NO. **M60050.002910**

AMENDMENT NO. 3
TO THE WORK PLAN
PHASE II REMEDIAL INVESTIGATION IRP SITE, EXPLOSIVE ORDNANCE DISPOSAL RANGE

DATE 11 JANUARY 2005

IS ENTERED IN THE DATABASE AND FILED AT ADMINISTRATIVE RECORD NO. **M60050.003220**

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ACRONYMS AND ABBREVIATIONS

BCT	BRAC Cleanup Team
BEC	BRAC Environmental Coordinator
BERA	Baseline Ecological Risk Assessment
bgs	below ground surface
BNI	Bechtel National, Inc.
BO	Biological Opinion
BRAC	Base Realignment and Closure
CLEAN	Comprehensive Long-Term Environmental Action Navy
COPCs	contaminants of potential concern
CRWQCB	California Regional Water Quality Control Board
DHS	Department of Health Services, California
DON	Department of the Navy
DQO	data quality objective
DTSC	Department of Toxic Substances Control
EOD	explosives ordnance disposal
FFA	Federal Facilities Agreement
FS	feasibility study
IRP	Installation Restoration Program
JEG	Jacobs Engineering Group, Inc.
KEA	KEA Environmental Inc.
MCAS	Marine Corps Air Station
NFECSW SDIEGO	Southwest Division, Naval Facilities Engineering Command
NPDES	National Pollutant Discharge Elimination System
OE	ordnance and explosives
QA/QC	quality assurance/quality control
RI	remedial investigation
SAP	sampling and analysis plan
SERA	screening ecological risk assessment
SOP	standard operating procedure
SVOC	semivolatile organic compound
TOC	total organic carbon
TVPH	total volatile petroleum hydrocarbons
TEPH	total extractable petroleum hydrocarbons
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
VOC	volatile organic compound

1. INTRODUCTION

This document is an amendment to the Final Work Plan, Phase II Remedial Investigation (RI), Installation Restoration Program (IRP) Site 1, Explosives Ordnance Disposal (EOD) Range, Marine Corps Air Station (MCAS) El Toro, California (Earth Tech 2001). The purpose of this amendment is to propose additional investigation for a bermed retention pond present in the northern portion of IRP Site 1 at the former MCAS El Toro, California. All sampling will be performed under the supervision of a qualified biologist and per the Biological Opinion (BO) provided by the United States Fish and Wildlife Service (USFWS). Elements of this sampling and analysis plan (SAP) include the rationale for the design of additional investigation, objectives, and procedures for field investigation activities, quality assurance/quality control requirements (QA/QC), and the approach for data analysis of the additional data. This document is to be used in conjunction with the Final Work Plan, Phase II Remedial Investigation, IRP Site 1, November 2001 (Earth Tech 2001).

The SAP amendment was prepared for the Base Realignment and Closure (BRAC) Program Management Office West and Southwest Division, Naval Facilities Engineering Command (NFECSW SDIEGO; formerly abbreviated as SWDIV), as authorized by the Pacific Division Naval Facilities Engineering Command under contract task order number 0072 of the Comprehensive Long-Term Environmental Action Navy (CLEAN) II program, contract number N62742-94-D-0048.

2. SITE BACKGROUND AND PHYSICAL SETTING

2.1 MCAS EL TORO BACKGROUND

MCAS El Toro is situated in a semi-urban, agricultural area of southern California, approximately 8 miles south of Santa Ana and 12 miles northeast of Laguna Beach (Figure 2-1). MCAS El Toro covers approximately 4,738 acres. Land use around the MCAS includes commercial, light industrial, and residential. MCAS El Toro closed on 2 July 1999, as part of the BRAC Act.

MCAS El Toro was added to the National Priorities List of the Superfund Program on 15 February 1990, due to volatile organic compound (VOC) contamination at the MCAS boundary and in the agricultural wells west of MCAS. A Federal Facilities Agreement (FFA) was signed by the Marine Corps/Department of the Navy (DON) in October 1990 with the United States Environmental Protection Agency (USEPA) Region IX, California Department of Health Services (DHS) (part of which is currently California Department of Toxic Substances Control [DTSC]), and the California Regional Water Quality Control Board, Santa Ana Region (CRWQCB).

In March 1993, MCAS El Toro was placed on the list of military facilities scheduled for closure under the BRAC Act. A BRAC Cleanup Team (BCT), including representatives from NFECSW SDIEGO, USEPA, DTSC, and CRWQCB, was formed to oversee implementation of the FFA.

Implementation of the FFA at MCAS El Toro included the following investigations and studies: Air Quality Solid Waste Assessment Test, Phase I RI, Phase II RI, and a feasibility study (FS). Groundwater sampling is conducted station wide on a routine basis by the DON.

2.2 IRP SITE 1 BACKGROUND

IRP Site 1 is situated in the northeast portion of MCAS El Toro in the foothills of the Santa Ana Mountains (Figure 2-1 and Figure 2-2). Site 1 is situated within a tributary canyon of Borrego Canyon Wash at elevations ranging from approximately 610 to 760 feet above mean sea level. Site 1 includes the Northern EOD Range (approximately 16.9 acres) and the Southern EOD Range (approximately 16.6 acres) (Bechtel National, Inc. [BNI] 1995).

A bermed retention pond is present in the northern portion of the site. Seasonal accumulations of rainwater were reported to have been observed in the retention pond. However, no ponding or accumulation contributing to surface water flow has been observed (June 1999 to present) by Earth Tech. A review of existing site data indicated that the pond was constructed in 1980 to prevent sheet flow from flooding the Site 1 area during precipitation events. The site has been characterized by fairly rapid groundwater recharge in response to storm events (Jacobs Engineering Group, Inc. [JEG] 1993).

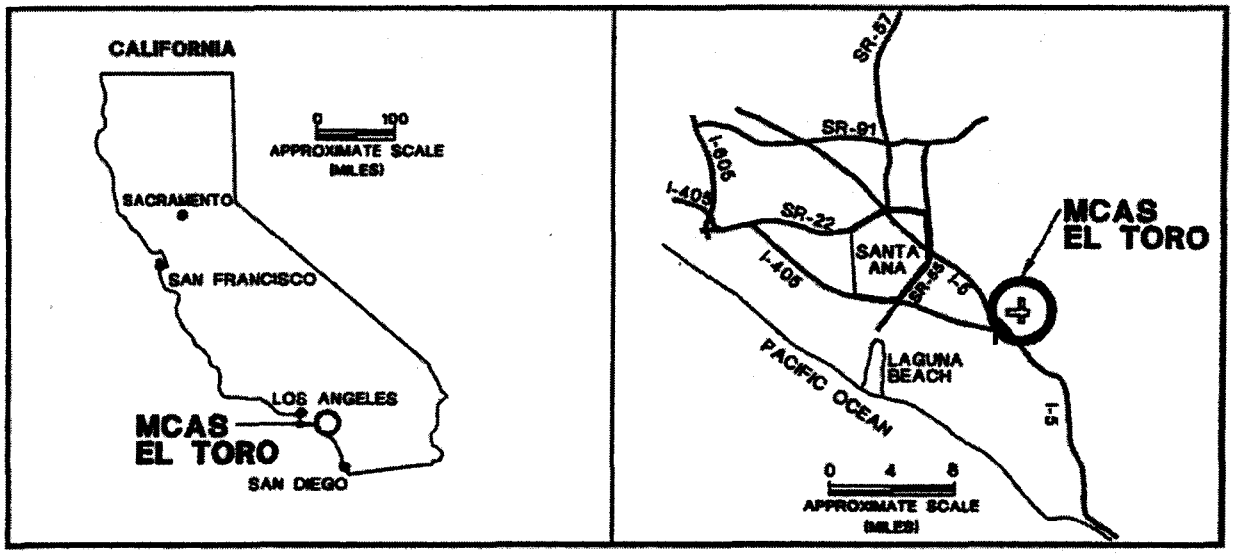
Training for EOD and detonation of munitions has been conducted at Site 1 since 1952. Additionally, there have been reports of burning of 2,000 gallons of sulfur trioxide chlorosulfonic acid (FS smoke) in trenches in the northern portion of the site, and unconfirmed reports of the disposal of low-level radioactive material at Site 1. It has been estimated that approximately 300,000 gallons of petroleum fuels were burned at Site 1 during exercises from 1952 through 1993. Such activities have a potential to contaminate the soil with ordnance and explosive (OE) items, explosives, perchlorate, fuel hydrocarbons, VOCs, semivolatile organic compounds (SVOCs), and dioxins. Potential contamination of groundwater is also expected due to leaching of contaminants from the soil; therefore, various investigations were performed at Site 1, with each investigation targeted toward specific environmental media or contaminants, to adequately define the nature and

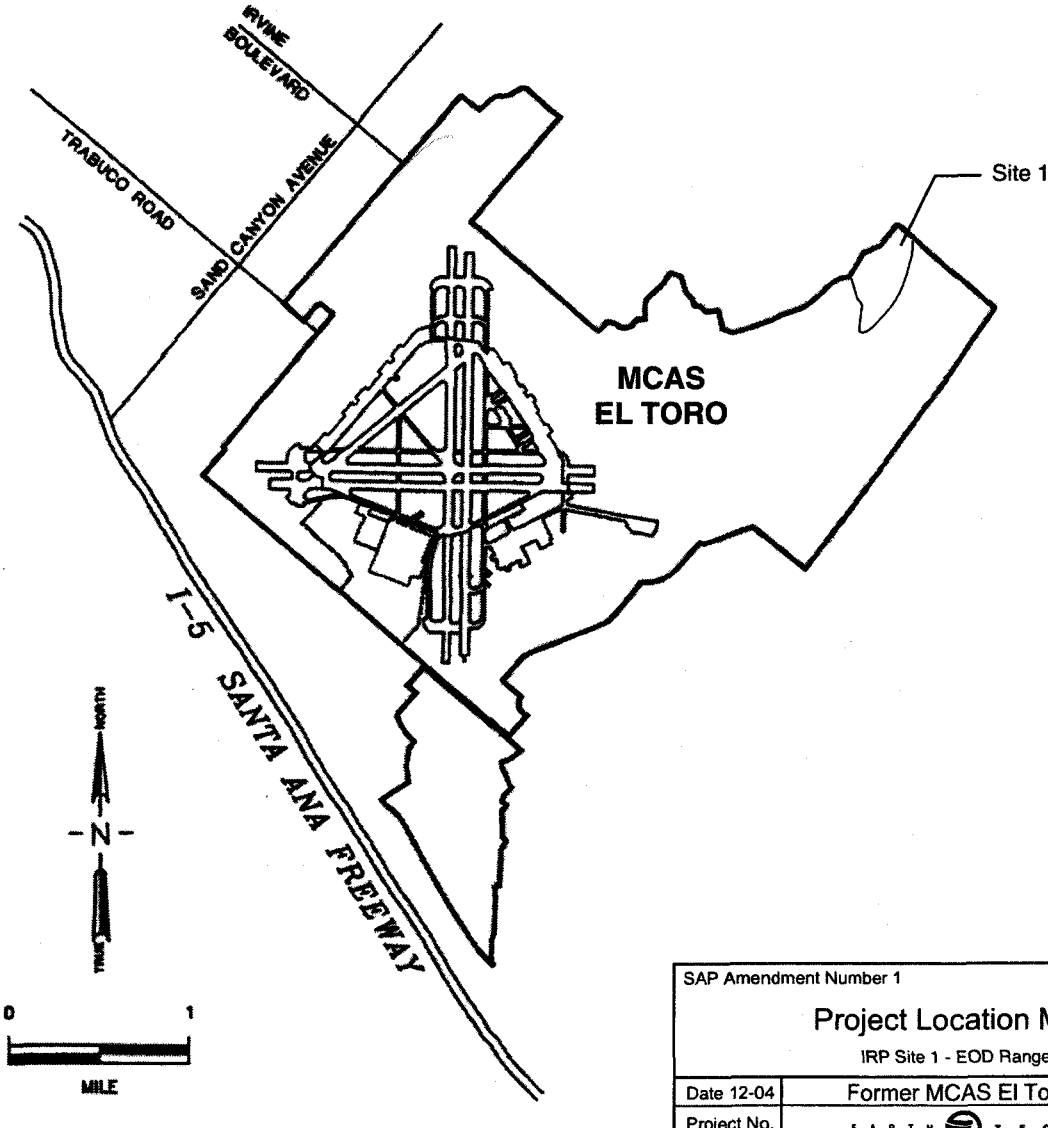
extent of contamination at the site. Based on their scopes, previous studies at Site 1 may be divided into following categories:

1. Geophysical surveys
2. Ordnance and explosives range evaluations
3. Soil investigations
4. Groundwater investigations
5. Habitat assessments

These studies defined the physical characteristics of Site 1, including geology, hydrogeology, and ecology, and estimated the nature and extent of contamination at the site. An overview of the results of these investigations is presented in the Phase II RI Work Plan.

In addition to the above investigations, soil and groundwater investigations are currently being undertaken at Site 1 as a part of the Phase II RI for comprehensive delineation of the nature and extent of contamination at the site.





SAP Amendment Number 1		Final
Project Location Map IRP Site 1 - EOD Range		
Date 12-04	Former MCAS El Toro	Figure 2-1
Project No. 36097	EARTH TECH A tyco INTERNATIONAL LTD. COMPANY	

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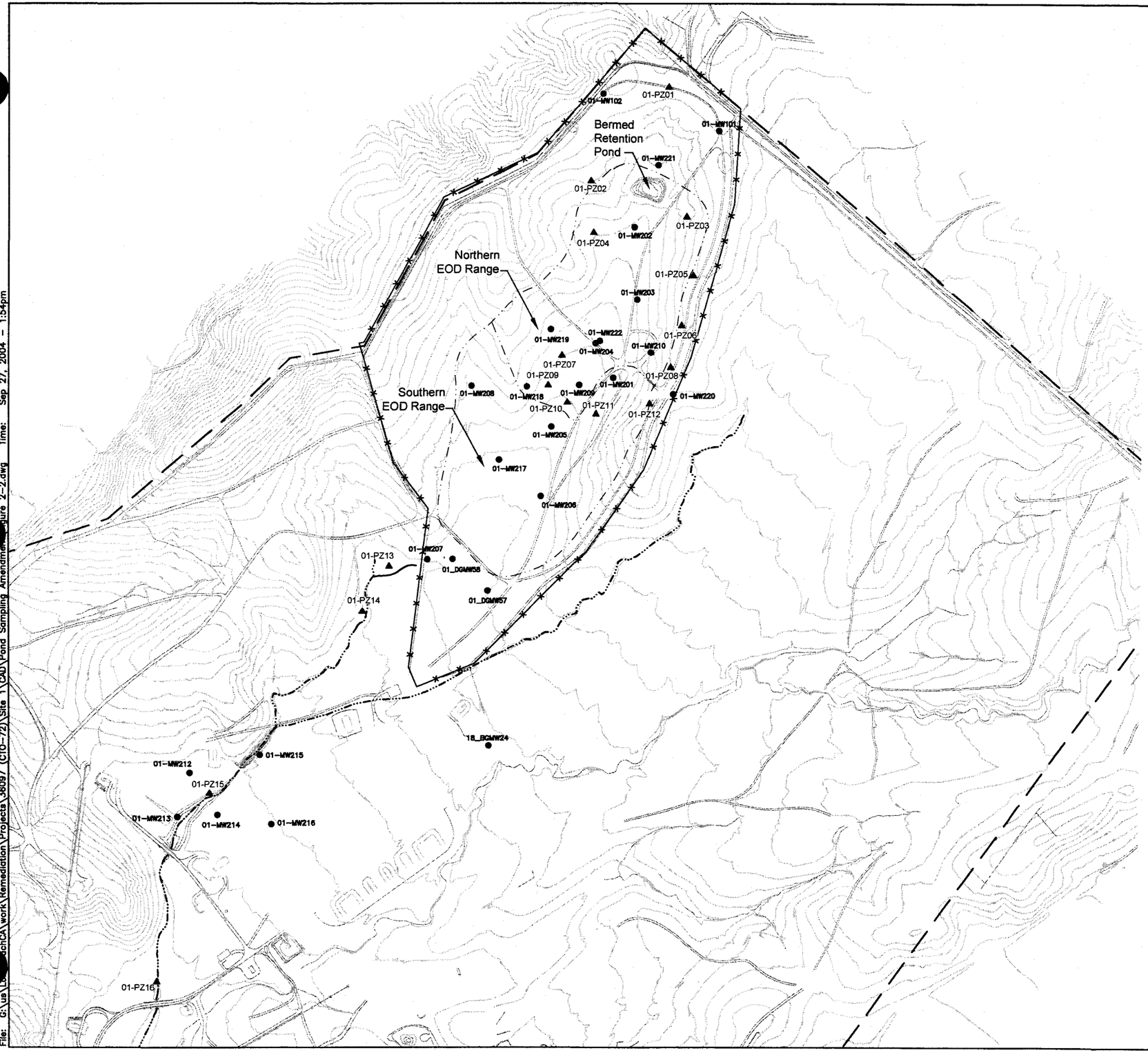

LEGEND:

- MCAS EL TORO BOUNDARY
- SECURITY FENCE/ SITE 1 BOUNDARY
- EOD RANGE BOUNDARY
- STREAM OR WASH
- 01-MW208 — GROUNDWATER MONITORING WELL (4-INCH)
- 01-PZ07 — PIEZOMETER (2-INCH GROUNDWATER MONITORING WELL)

NORTH

0 250' 500'

SCALE: 1"= 500'

SAP Amendment Number 1 — Final

Site 1 Vicinity

IRP Site 1 - EOD Range

Date: 12-04	Former MCAS El Toro	Figure 2-2
Project No. 36097	EARTH TECH — A tyco INTERNATIONAL LTD. COMPANY	

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3. RATIONALE FOR THE AMENDMENT

A dry sampling in 1996 and subsequent wet sampling in 1998 conducted in the bermed retention pond of Site 1 revealed the presence of the Riverside fairy shrimp (*Streptocephalus. woottoni),* listed as an endangered species by the USFWS (KEA Environmental Inc. [KEA] 1998). On 20 December 2000, a habitat assessment of the ecological characteristics of Site 1 was conducted. The assessment suggested that the dominant vegetation types at the site consist of non-native grassland coastal sage scrub and toyon-sumac chaparral. The wildlife documented at Site 1 includes one reptile, thirty-six amphibians, and six mammalian species. Additionally, some special status species, including those listed by the state and federal agencies as endangered, threatened, rare or of special concern, were documented at Site 1. One such species is the Riverside fairy shrimp.

During the preparation of the Phase II RI, with the presence of a special status species at Site 1, DON sent a letter (dated 22 March 2001 [DON 2001]) to Mr. James Bartel, Field Supervisor for USFWS, Carlsbad, California. The letter provided background information and a description of the proposed Phase II RI activities at Site 1 and the measures that the Navy would be taking to prevent impacts to biological resources at Site 1. In relation to the Riverside fairy shrimp, the letter mentioned that the fairy shrimp has been detected in the pond, but no intrusive activities were planned for the pond area at that time.

In response to the above-mentioned letter, DON received a letter (USFWS 2001) sent by USFWS on 3 May 2001. The letter largely concurred with the Navy's findings that the RI at Site 1, as described, was not likely to adversely affect federally listed threatened and endangered species, specifically the Riverside fairy shrimp. The letter also stated that the interagency consultation requirements of section 7 of the Endangered Species Act of 1973, as amended, had been satisfied.

Concerning the Riverside fairy shrimp, the letter stated that the proposed investigation does not appear to yield enough information to determine whether the use of Site 1 as an EOD range has resulted in contamination that is negatively affecting Riverside fairy shrimp in the pond. Additional investigations, such as analyzing surface water from the pond, were suggested.

The Phase II RI Work Plan for Site 1 was finalized in November 2001 (Earth Tech 2001). This work plan proposed surface water sampling in the pond area, but did not propose any soil investigation for the bermed retention pond as there was no indication that EOD training activities might have impacted the pond soil. Soil and groundwater investigations were conducted at Site 1 in accordance with the Phase II RI Work Plan and a screening ecological risk assessment (SERA) was conducted using the data collected. The risk assessment concluded that one VOC, two SVOCs, one explosive, perchlorate, 13 metals, and dioxins in surface soil exceed screening values for terrestrial ecological receptors at Site 1(Earth Tech 2003). Therefore, the site fails the SERA and further evaluation of soil pathways was recommended in an Ecological Risk Assessment. A draft version of the ecological risk assessment was submitted to the regulatory agencies for review and various discussions were held between DON and USFWS, USEPA, DTSC, and CRWQCB, in which the risks to the Riverside fairy shrimp due to EOD training activities were discussed. As a result of these discussions, DON agreed to conduct sampling in the pond area to assess if the EOD training activities at Site 1 are negatively impacting the Riverside Fairy Shrimp.

The draft version of the Work Plan Amendment No. 1 (subsequently renamed SAP Amendment No. 1) was submitted to the BCT in November 2002. The Work Plan Amendment outlined the collection of a surface and a subsurface sample at three locations within the pond at Site 1. The USEPA comments on this Work Plan Amendment were received in December 2002 (see Appendix A). These comments recommended that, in addition to soil sampling at three discrete locations within the pond, sampling based on a grid that covers the entire pond be utilized. It was

further suggested that a number of samples should be collected within each grid square and composited and subsampled for analysis. In a meeting held on 10 June 2003, the Navy agreed that, in addition to the discrete samples previously outlined, grid sampling would be acceptable to characterize the impact to the Riverside fairy shrimp. In addition, due to a lack of contaminant thresholds for Riverside fairy shrimp (especially for explosives compounds), USFWS representatives recommended reporting limits for explosives and ecological screening criteria for metals.

4. DATA QUALITY OBJECTIVES

The purpose of this SAP amendment is to propose additional investigation of the pond area in the northern portion of Site 1. The USEPA data quality objectives (DQOs) process was used for the design of this investigation.

4.1 PROBLEM STATEMENT

Training for EOD and detonation of munitions was conducted within the Northern and Southern EOD Ranges (well south of the pond) from 1952 until base closure in 1999. Although previous soil sampling near the pond area did not yield appreciable concentrations of contaminants of potential concern (COPCs), such activities have a potential to contaminate the environmental media such as soil or surface water when present in the pond area at Site 1. Because the pond at Site 1 contains sediments, this contamination could cause adverse impacts to the Riverside fairy shrimp if a viable population does exist in the pond. Investigation of the pond area was deemed necessary to assess potential exposure(s) to contamination due to the use of Site 1 as an EOD range.

The final study design is the result of consensus of the BCT made up of the Navy BRAC Environmental Coordinator (BEC) and representatives from regulatory agencies, including DTSC, USEPA, and CRWQCB. Although California Department of Fish and Game and U.S. Fish and Wildlife Service representatives are not members of the BCT, they are also included in the process.

4.2 DECISION STATEMENT

The investigation at the pond area is designed to address the following study question:

1. Do concentrations of target analytes in the pond sediments exceed the decision thresholds?

The results of the sediment sampling will be used for screening purposes (Tier 1, Step 2 of the Navy's 3-tiered approach). If the results of the sediment sampling and analysis in the pond area indicate that concentrations of target analytes do not exceed the decision thresholds, no further investigation will be recommended for the pond area. For organics and perchlorate, the decision thresholds are based on literature-derived risk-based screening values (where available) or laboratory reporting limits. For metals, the decision thresholds are based on literature-derived risk-based screening values (where available) or the El Toro background concentrations (BNI 1996).

However, if the results of the sediment sampling and analysis exceed the decision thresholds, further refinement of the conservative assumptions will be made in the subsequent Baseline Ecological Risk Assessment (BERA) (Tier 2, Step 3a of the Navy's 3-tiered approach). If the refinement does not support an acceptable risk to Riverside fairy shrimp, then toxicity testing will be proposed (methodology to be determined at a later date) as a part of Tier 2, Step 3b of the Navy's 3-tiered approach.

4.3 INPUTS TO THE DECISION

Resolution of the principal study questions will be based on laboratory analyses of sediment samples collected from within the boundaries of the pond.

Samples will be analyzed for target list VOCs, SVOCs, nitroaromatics/nitroamines (explosives), and metals, as well as total volatile petroleum hydrocarbons (TVPH), total extractable petroleum hydrocarbons (TEPH), and perchlorate.

The project decision threshold for each organic analyte has been determined by a comparison of the available values. Where no risk-based screening value is available through either literature or literature-based calculation, the laboratory reporting limit is used. Where the risk-based screening value is higher than the laboratory reporting limit, the risk-based screening value is used. Where the risk-based screening value is lower than the laboratory reporting limit, the laboratory reporting limit is used, as that value is the lowest concentration that the laboratory can reliably identify and quantify the analyte.

4.4 STUDY BOUNDARIES

The decision unit for this study is represented by physical boundaries of the pond area. The boundaries are presented in Figure 4-1.

4.5 DECISION RULE

The decision rules for this study are presented below:

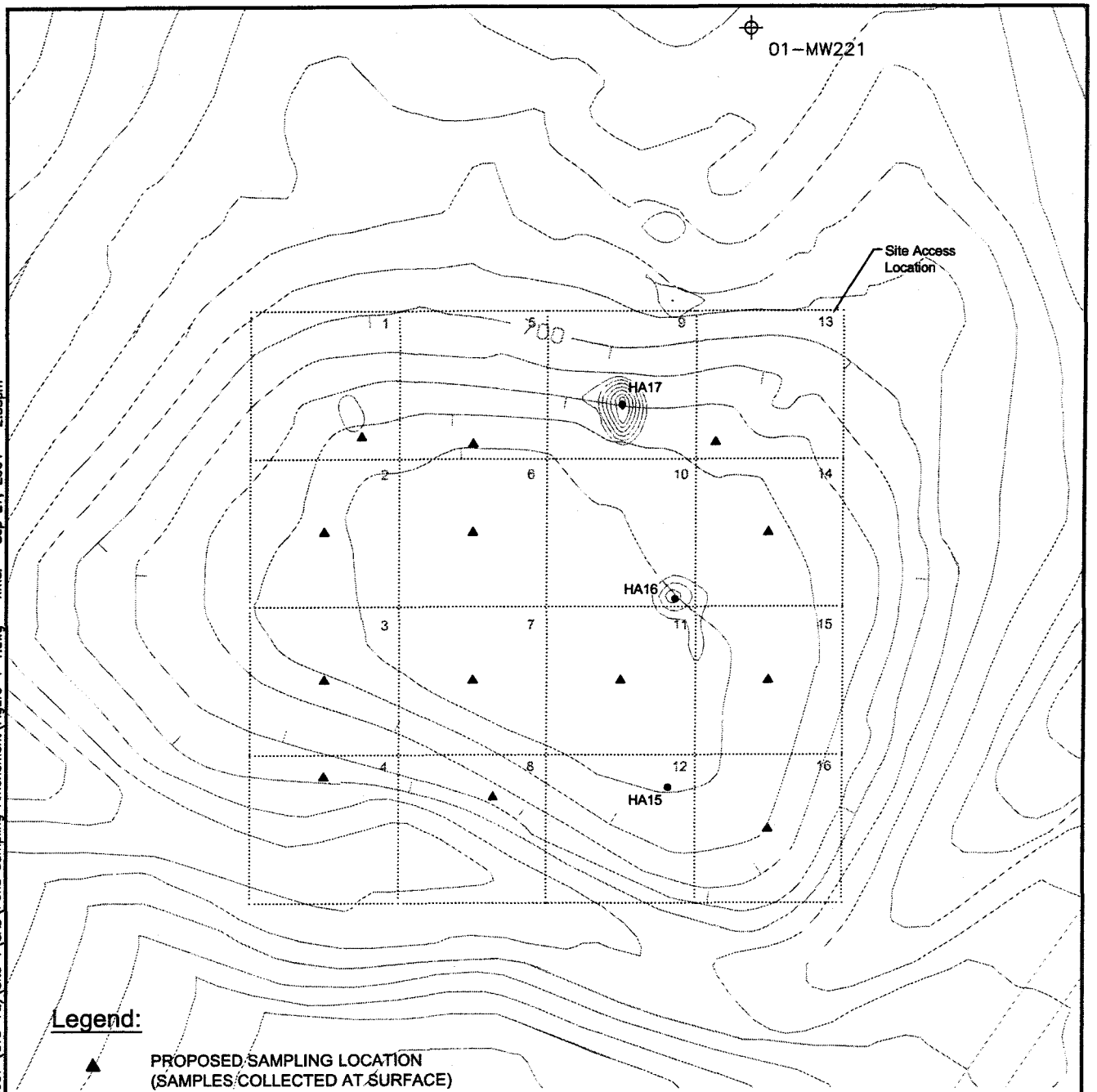
- ***If*** the maximum concentration of each target organic analyte, perchlorate, and metal for all sampling points within the pond is below its respective decision threshold, ***then*** no further investigation will be recommended for the pond area.
- ***If*** the maximum concentration of any target analyte for all sampling points within the pond is greater than its respective decision threshold, ***then*** additional evaluation will be proposed, including incorporation of analytical data into a Tier 2 BERA and if necessary, toxicity testing will be proposed (methodology to be determined at a later date).

A flowchart representation of the decision rules is presented as Figure 4-2.

4.6 LIMITATIONS OF DECISION AND ERRORS

The sampling design has both judgmental and statistical elements that will affect the ability to arrive at a correct decision.

In the absence of prior data to characterize the variability, distribution, and concentrations of target analytes in the sediments, the number for sediment samples for comparison with decision thresholds is based on judgment and the consensus of stakeholders. Therefore, no probabilities associated with decisions can be assigned, and consequently no tolerable limits on decision errors can be defined. Qualitative analysis of the decision errors is presented in Table 4-1.



Legend:

- PROPOSED SAMPLING LOCATION (SAMPLES COLLECTED AT SURFACE)
- HA15 — PROPOSED JUDGEMENT-BIASED SAMPLING LOCATION (SAMPLES COLLECTED AT SURFACE AND 5-FEET BELOW GROUND SURFACE)
- 3 — 30-FOOT BY 30-FOOT SAMPLING GRID AND BLOCK NUMBER
- ELEVATION CONTOUR
- GEOPHYSICAL ANOMALY
- 01-MW221 — EXISTING GROUNDWATER MONITORING WELL

NORTH

0 15' 30'

SCALE: 1"= 30'

SAP Amendment Number 1 — Final

Proposed Site 1 Pond Sampling Locations

IRP Site 1 - EOD Range

Date	12-04	Former MCAS El Toro	Figure
Project No.	36097	EARTH TECH	4-1

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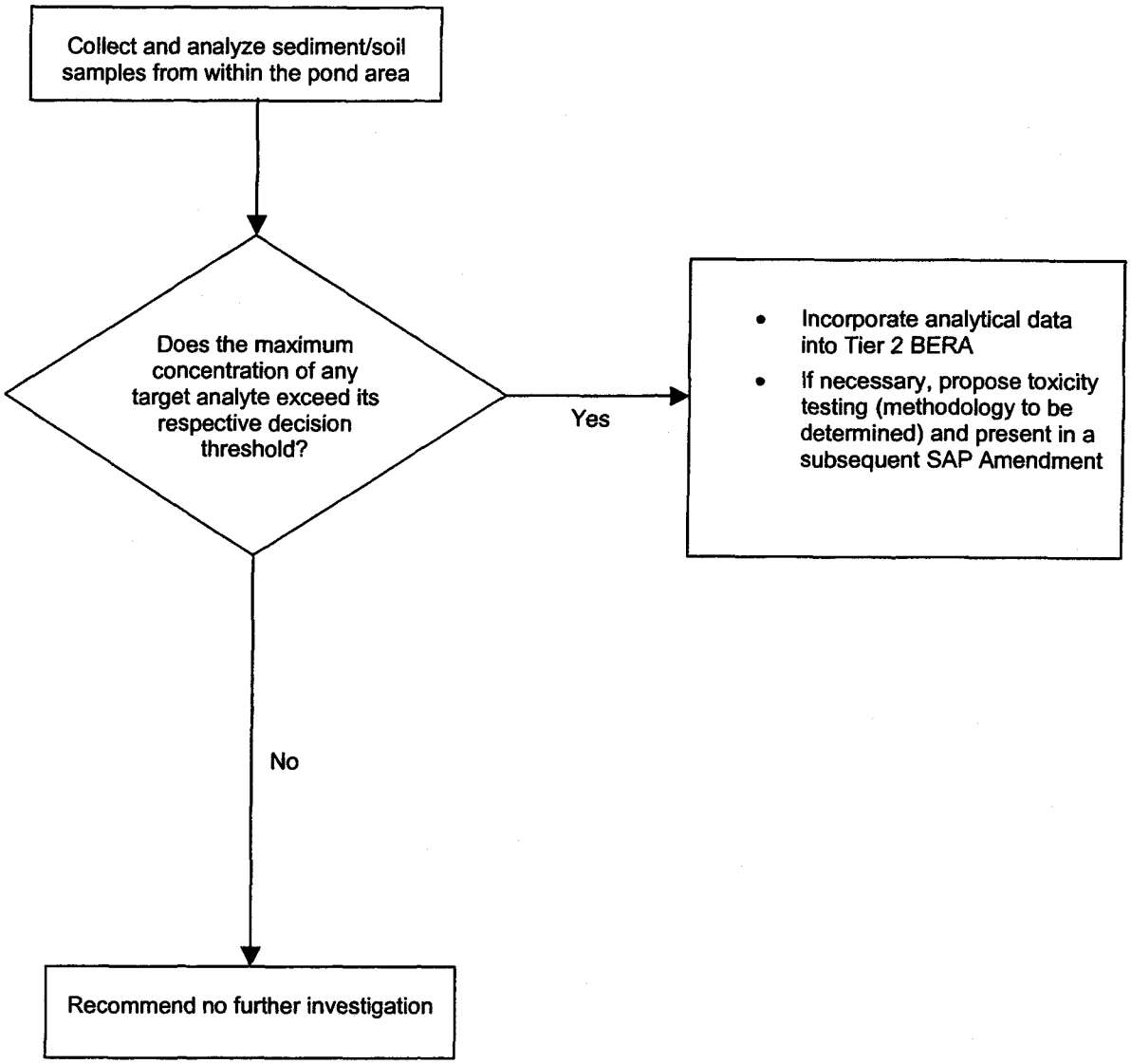

Figure 4-2: Investigation Decision Flowchart

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Table 4-1: Qualitative Analysis of Decision Errors for Assessing the Pond Area

Decision	Decision Based on Sample Data	True Condition	Associated Consequences	Sources of Error
1	Concluding that the one or more contaminants in the pond exceed their respective decision thresholds.	All the contaminants at the pond area are below their respective decision thresholds.	Erroneous conclusion that the contamination at the pond area may adversely affect the Riverside fairy shrimp. Unnecessary expenditure of resources on further investigation at the pond area.	Uncertainty associated with sampling and laboratory analysis. Use of reporting limits as decision thresholds where no risk-based screening criteria exist
2	Concluding that all the contaminants in the pond are below their respective decision thresholds.	One or more contaminants in the pond area are above their respective decision thresholds.	Erroneous conclusion that the contamination at the pond area is not likely to cause any adverse effect to the riverside fairy shrimp. Adverse impacts on ecology due to adverse impacts on the Riverside fairy shrimp, which is a sensitive species.	Dilution of the concentrations of contaminants due to mixing and homogenizing of discrete samples Size of the hot spot less than the size that can be successfully detected by the selected grid spacing.

4.7 STUDY DESIGN

Based on discussions with stakeholders, a sampling grid of 30-foot by 30-foot squares was established over the site. The conceptual model for contaminant distribution warrants selecting three blocks for judgment-biased sampling. Block 12 lies within the lowest portion of the pond and represents the location with the highest potential for accumulation of any residuals from the EOD training and due to sheet flow, and blocks 9 and 10 contain the geophysical anomalies within and slightly upgradient of the pond area identified during previous non-intrusive geophysical investigations (see Figure 4-1).

Within the three blocks selected for judgment-biased sampling, two samples will be collected. One sample will be collected at the surface, which will be used to represent the exposure concentration in the fairy shrimp screening risk assessment. The second sample will be collected at 5 feet below ground surface (bgs) or just below the depth of the geophysical anomaly if it is determined that the anomaly is shallower than 5 feet bgs, and will be used to evaluate the nature and extent of potential contamination due to the anomaly. The samples will be analyzed for VOCs, SVOCs, TEPH, TVPH, metals, and perchlorate. In the 13 blocks not selected for judgment-biased sampling, a single surface sample will be collected from each block and analyzed for VOCs, SVOCs, TEPH, TVPH, metals, and perchlorate.

Additionally, for all 16 blocks, composite samples will be collected and analyzed for explosives. Each of the blocks will be divided into four sub-blocks. There will be one surface subsample collected from each of the four sub-blocks. The subsamples will be collected from the center of each sub-block unless metallic debris, distressed vegetation, or staining is noted; in this case, a subsample will be collected from the area of interest. The four subsamples collected from each block will be composited into one sample for laboratory analysis by homogenizing in an aluminum-lined pan. Composite sampling for this analyte group was selected to address the concern that the mechanism for distribution of explosives from detonations may result in scattering of particles.

The ecological risk screening values were developed based on an assumption of 1% Total Organic Carbon (TOC). As part of the assessment, each soil sample will be analyzed for TOC. The results

obtained will be used to revise the ecological screening values. If the actual TOC values are lower than 1%, then the ecological risk screening values will be correspondingly lower; if TOC values are higher than 1%, then the screening values will be correspondingly higher.

5. FIELD SAMPLING PLAN

Fieldwork will be performed in accordance with applicable CLEAN standard operating procedures (SOPs) (BNI 1999). Earth Tech field personnel will have copies of all referenced SOPs during the fieldwork. Approved CLEAN SOPs were submitted to the BCT by NFECSW SDIEGO; copies of the SOPs can be provided to reviewers of this document upon request.

5.1 SOIL SAMPLING

Samples will be collected in accordance with CLEAN SOP 4, Soil Sampling (BNI 1999). A California licensed surveyor will survey grid centers.

5.1.1 Special Considerations

During sampling activities, every effort will be made to minimize disturbance in the pond area. Site access will be through the vicinity of block 13 (see Figure 4-1) in the northeastern corner of the pond. The minimum number of personnel possible will be utilized in sample collection. Every effort will be made to collect the samples when the soil within the pond is dry. In the case of muddy or inundated conditions, appropriate measures will be taken to access the sampling locations, thus reducing the impact to fairy shrimp habitat, including the use of boards to access the sampling locations. Field activities will be supervised by a biologist with a valid Section 10(a)(1)(A) permit for Riverside fairy shrimp. The biologist will provide direction in the field regarding avoidance and minimization measures, as appropriate. The USFWS has issued a BO for this work, which is presented in Appendix B of this document. The biologist will ensure that any provisions specified in the BO are strictly followed.

5.1.2 Soil Sampling

Soil samples will be collected in the pond area at Site 1 in accordance with the sampling design presented in Section 4.7. Surface soil samples will be collected using unused disposable trowels. Subsurface soil samples collected at the depth of 5 feet bgs will be collected using a hand auger, with the exception of the sample point at the low area of the pond. At that location, an undisturbed core will be extracted from just below the surface sample to 5 feet bgs, which will be retained for geotechnical evaluation, if necessary. Then at 5 feet bgs, a soil sample will be collected using a hand auger, which will be submitted for chemical analysis.

While primarily, disposable equipment is planned, where reusable sampling equipment comes in contact with samples, an equipment rinsate will be collected to evaluate the potential for cross-contamination. Individual sampling grids will be differentiated by the use of string. Composite samples will be analyzed only for explosives, as described in Section 4.7, Study Design, and will be prepared from four discrete samples, collected within each grid. The discrete samples will be combined in equal amounts in a disposable aluminum pan, mixed, and subsampled for analysis. The sampling and analysis summary is presented in Table 5-1.

5.2 SAMPLE COLLECTION, SHIPPING, AND DOCUMENTATION

Sample packaging and shipment will be in accordance with Section 4.2.8 of the Final Work Plan for Phase II RI at Site 1 (Earth Tech 2001).

5.3 SAMPLE DOCUMENTATION

Sample containers will be labeled as specified in Section 4.2.9 of the Final Work Plan for Phase II RI at Site 1 (Earth Tech 2001).

5.4 INVESTIGATION-DERIVED WASTE

Investigation-derived waste will be managed in accordance with Section 4.2.5 of the Final Work Plan for Phase II RI at Site 1 (Earth Tech 2001).

Table 5-1: Planned Sampling and Analysis Summary

Analysis	Method	Field Samples	Field Duplicates	Total Samples	Container	Preservative	Holding Time
Soil Sampling for Assessment of Contamination within the Pond Area							
Total Volatile Petroleum Hydrocarbons	SW5035/ SW8015B	19	2	21	3 Encore samplers	Cool to 4°C	48 hours[a] (7 days if frozen)
Volatile Organic Compounds	SW5035/ SW8260B	19	2	21	3 Encore samplers	Cool to 4°C	48 hours[a] (7 days if frozen)
Nitroaromatics/ nitroamines (explosives)	SW8330	16	2	18 (One composite of 4 subsamples within each block)	One 16-ounce glass jar or stainless steel liner with Teflon-lined lid/end caps	Cool to 4°C	14 days[b]/40 days[c]
Semivolatile Organic Compounds	SW3550B/ SW8270C	19	2	21	One 16-ounce glass jar or stainless steel liner with Teflon-lined lid/end caps	Cool to 4°C	14 days[b]/40 days[c]
Total Extractable Petroleum Hydrocarbons	SW3550B/ SW8015B	19	2	21			14 days[b]/40 days[c]
Perchlorate	Modified SW9058	19	2	21			28 days[a]
Metals	SW3050B/ SW6010/7000	19	2	21			6 months[a] (28 days for mercury)
Total Organic Carbon	Combustion or Chemical Oxidation	19	2	21	One 16-ounce glass jar or stainless steel liner with Teflon-lined lid/end caps	Cool to 4°C	28 days
Soil Sampling for Pond Soil Properties							
Permeability	ASTM D5084	1	0	1	Shelby Tubes	Cool to 4°C	N/A

Notes:
°C = degrees Celsius
N/A = Not Applicable
[a] From sample collection to analysis
[b] From sample collection to extraction
[c] From sample extraction to analysis

6. QUALITY ASSURANCE PROJECT PLAN

6.1 PROJECT MANAGEMENT

Project task organization and project organization are described in Section 5.1 of the Final Work Plan for Phase II RI at Site 1 (Earth Tech 2001).

6.2 MEASUREMENT AND DATA ACQUISITION

Quality assurance requirements for data acquisition are presented in Section 5.2 of the Final Work Plan for Phase II RI at Site 1 (Earth Tech 2001). Table 6-1 presents updated quality control criteria. Soil concentrations will be reported on a dry weight basis.

Table 6-1: Project Quality Control Criteria for Soil Samples

Analyte	Risk-based Screening Value	Laboratory Reporting Limit	Project Decision Threshold[a]	Precision (RPD)	Accuracy (%R)[b]	
					MS/MSD	LCS
VOCs (Extraction: SW5035; Analysis: SW8260B) (µg/kg)						
1,1,1-Trichloroethane	NA	5	5	30	65–135	65–135
1,1,2,2-Tetrachloroethane	NA	5	5	30	64–135	64–135
1,1,2-Trichloroethane	NA	5	5	30	65–135	65–135
1,1-Dichloroethane	NA	5	5	30	62–135	62–135
1,1-Dichloroethene	NA	5	5	29	69–127	71–125
1,2-Dichloroethane	NA	5	5	30	58–137	58–137
cis-1,2-Dichloroethene	NA	5	5	30	65–135	65–135
trans-1,2-Dichloroethene	NA	5	5	30	65–135	65–135
1,2-Dichloropropane	NA	5	5	30	60–135	60–135
2-Butanone	4,744[(1)]	50	4,700	50	50–150	50–150
2-Hexanone	12.8[(1)]	10	13	50	50–150	50–150
4-Methyl-2-pentanone	18.6[(1)]	10	19	50	50–150	50–150
Acetone	30[(1)]	20	30	50	35–165	35–165
Benzene	96[(1)]	5	96	22	75–119	76–118
Bromodichloromethane	NA	5	5	30	65–135	65–135
Bromoform	NA	5	5	30	65–135	65–135
Bromomethane	NA	5	5	30	62–135	62–135
Carbon disulfide	NA	5	5	30	65–135	65–135
Carbon tetrachloride	NA	5	5	30	52–135	52–135
Chlorobenzene	NA	5	5	21	75–125	76–116
Chloroethane	NA	5	5	30	55–135	55–135
Chloroform	9.5[(1)]	5	9.5	30	64–135	64–135
Chloromethane	NA	5	5	30	65–135	65–135
cis-1,3-Dichloropropene	NA	5	5	30	64–135	64–135
Dibromochloromethane	NA	5	5	30	63–135	63–135
Ethylbenzene	24[(1)]	5	24	30	65–135	65–135

Table 6-1: Project Quality Control Criteria for Soil Samples

Analyte	Risk-based Screening Value	Laboratory Reporting Limit	Project Decision Threshold[a]	Precision (RPD)	Accuracy (%R)[b]	
					MS/MSD	LCS
Methylene chloride	NA	5	5	30	65–135	65–135
Styrene	NA	5	5	30	65–135	65–135
Tetrachloroethene	428[(1)]	5	428	29	66–125	69–121
Toluene	18[(1)]	5	18	21	72–126	72–126
trans-1,3-Dichloropropene	NA	5	5	30	56–135	56–135
Trichloroethene	NA	5	5	30	61–135	61–135
Vinyl chloride	NA	5	5	30	36–144	36–144
Xylenes (total)	27[(1)]	15	27	30	65–135	65–135
SVOCs (Extraction: SW3550B; Analysis: SW8270C) (µg/kg)						
1,2,4-Trichlorobenzene	NA	330	330	61	10–132	40–116
1,2-Dichlorobenzene	NA	330	330	30	32–135	32–135
1,3-Dichlorobenzene	NA	330	330	30	26–135	26–135
1,4-Dichlorobenzene	NA	330	330	57	15–128	38–116
2,2'-oxybis(1-Chloropropane)	NA	330	330	30	36–135	36–135
2,4,5-Trichlorophenol	NA	330	330	30	25–175	25–175
2,4,6-Trichlorophenol	NA	330	330	30	29–138	29–138
2,4-Dichlorophenol	NA	330	330	30	36–135	36–135
2,4-Dimethylphenol	NA	330	330	30	35–149	35–149
2,4-Dinitrophenol	NA	1700	1700	30	25–161	25–161
2-Chloronaphthalene	NA	330	330	30	50–135	50–135
2-Chlorophenol	NA	330	330	54	12–120	35–113
2-Methylnaphthalene	70[(3)]	25[c]	70	50	50–150	50–150
2-Methylphenol	NA	330	330	30	25–135	25–135
2-Nitroaniline	NA	1700	1700	30	40–135	40–135
2-Nitrophenol	NA	330	330	30	34–135	34–135
3,3'-Dichlorobenzidine	NA	660	660	30	25–175	25–175
3-Nitroaniline	NA	1700	1700	30	41–135	41–135
4,6-Dinitro-2-methylphenol	NA	1700	1700	30	25–144	25–144
4-Bromophenyl-phenylether	NA	330	330	30	43–137	43–137
4-Chloro-3-methylphenol	NA	330	330	58	10–126	37–113
4-Chloroaniline	NA	660	660	30	35–146	35–146
4-Chlorophenyl-phenyl ether	NA	330	330	30	41–142	41–142
4-Methylphenol	NA	330	330	30	25–135	25–135
4-Nitroaniline	NA	1700	1700	30	30–153	30–153
4-Nitrophenol	NA	1700	1700	60	12–132	15–128
Acenaphthene	16[(3)]	25[c]	25	50	50–150	50–150
Acenaphthylene	44[(3)]	25[c]	44	50	50–150	50–150

Table 6-1: Project Quality Control Criteria for Soil Samples

Analyte	Risk-based Screening Value	Laboratory Reporting Limit	Project Decision Threshold[a]	Precision (RPD)	Accuracy (%R)[b]	
					MS/MSD	LCS
Anthracene	57.2[(4)]	25[c]	57.2	50	50–150	50–150
Benzo(a)anthracene	108[(4)]	25[c]	108	50	50–150	50–150
Benzo(a)pyrene	150[(4)]	25[c]	150	50	50–150	50–150
Benzo(b)fluoranthene	NA	25[c]	25	50	50–150	50–150
Benzo(g,h,i)perylene	NA	25[c]	25	50	50–150	50–150
Benzo(k)fluoranthene	NA	25[c]	25	50	50–150	50–150
bis(2-Chloroethoxy)methane	NA	330	330	30	39–135	39–135
bis(2-Ethylhexyl)phthalate	2,613[(1)]	330	2,613	30	34–135	34–135
bis-(2-Chloroethyl)ether	NA	330	330	30	25–139	25–139
Butylbenzylphthalate	NA	330	330	30	25–135	25–135
Carbazole	NA	330	330	30	25–159	25–159
Chrysene	166[(4)]	25[c]	166	50	50–150	50–150
Di-n-butylphthalate	483[(1)]	330	483	30	40–135	40–135
Di-n-octylphthalate	NA	330	330	30	42–135	42–135
Dibenz(a,h)anthracene	33[(4)]	25[c]	33	50	50–150	50–150
Dibenzofuran	NA	330	330	30	25–175	25–175
Diethylphthalate	145[(1)]	330	330	30	25–136	25–136
Dimethylphthalate	NA	330	330	30	28–137	28–137
Fluoranthene	111[(4)]	25[c]	111	50	50–150	50–150
Fluorene	77[(4)]	25[c]	77	50	50–150	50–150
Hexachlorobenzene	77[(5)]	330	330	30	36–143	36–143
Hexachlorobutadiene	NA	330	330	30	25–135	25–135
Hexachlorocyclopentadiene	NA	1700	1700	30	31–135	31–135
Hexachloroethane	NA	330	330	30	25–163	25–163
Indeno(1,2,3-cd)-pyrene	NA	25[c]	25	50	50–150	50–150
Isophorone	NA	330	330	30	25–175	25–175
N-Nitroso-di-n-propylamine	NA	330	330	30	40–135	40–135
N-Nitroso-diphenylamine	3821[(1)]	1700	3,821	30	36–143	36–143
Naphthalene	176[(4)]	25[c]	176	50	50–150	50–150
Nitrobenzene	NA	330	330	62	10–134	32–122
Pentachlorophenol	NA	1700	1700	62	10–134	15–128
Phenanthrene	204[(4)]	25[c]	204	50	50–150	50–150
Phenol	25[(6)]	330	330	53	10–116	30–111
Pyrene	195[(4)]	25[c]	195	50	50–150	50–150
TVPH (Extraction: SW5035; Analysis: SW8015B) (mg/kg)						
Volatile Petroleum Hydrocarbons	NA	10	10	28	71–127	72–124
TEPH (Extraction: SW3550B; Analysis: SW8015B) (mg/kg)						

Table 6-1: Project Quality Control Criteria for Soil Samples

Analyte	Risk-based Screening Value	Laboratory Reporting Limit	Project Decision Threshold[a]	Precision (RPD)	Accuracy (%R)[b]	
					MS/MSD	LCS
Extractable Petroleum Hydrocarbons	NA	10	10	50	50–149	51–134
Nitroaromatics/nitroamines (Explosives) (Extraction and analysis: SW 8330) (µg/kg)						
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	6,137[7]	250	6,137	23	64–109	59–111
Hexahydro-1,3,5-trinitro-1,3,5-triazine(RDX)	363[7]	250	363	33	63–129	65–113
1,3,5-Trinitrobenzene (1,3,5-TNB)	120[7]	250	250	24	76–125	73–110
1,3-Dinitrobenzene (1,3-DNB)	37[7]	250	250	20	73–111	66–109
Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	NA	250	250	29	60–117	48–116
Nitrobenzene (NB)	2723[2]	250	2723	21	72–114	68–107
2,4,6-Trinitrotoluene (2,4,6-TNT)	1,692[7]	250	1,692	26	69–120	70–111
4-Amino-2,6-dinitrotoluene (4-Am-DNT)	NA	250	250	27	63–118	55–114
2-Amino-4, 6-dinitrotoluene (2-Am-DNT)	NA	250	250	29	65–122	62–115
2,4-Dinitrotoluene (2,4-DNT)	73[2]	250	250	29	65–122	62–115
2,6-Dinitrotoluene (2,6-DNT)	223[2]	250	250	27	63–118	55–114
2,4-diamino-6-nitrotoluene (2,4-DANT)	35[8]	250	250	30	60-130	60-130
2,6-diamino-4-nitrotoluene (2,6-DANT)	177[8]	177	250	30	60-130	60-130
2-Nitrotoluene (2-NT)	NA	250	250	38	50–126	44–120
3-Nitrotoluene (3-NT)	NA	250	250	23	68–114	62–118
4-Nitrotoluene (4-NT)	NA	250	250	38	50–126	44–120
Perchlorate (Method: Modified 314.0) ug/Kg						
Perchlorate	NA	20	20	20	75–125	80–120

Metals (Preparation: SW 3050B; Analysis: Mercury SW 7471, all other metals SW 6010) (mg/kg)

Analyte	Risk-based Screening Value	El Toro Background Threshold[d]	Laboratory Reporting Limit	Project Decision Threshold[a]	Precision (RPD)	Accuracy (%R)[b]	
						MS/MSD	LCS
Aluminum	NA	14,800	5	14,800	20	75–125	80–120
Antimony	2[9]	3.06	2	2	20	75–125	80–120
Arsenic	9.79[4]	6.86	0.3	9.79	20	75–125	80–120
Barium	500[10]	173	1	500	20	75–125	80–120
Beryllium	NA	0.669	0.2	0.669	20	75–125	80–120
Cadmium	0.99[4]	2.35	0.2	0.99	20	75–125	80–120
Calcium	NA	46,000	10	46,000	20	75–125	80–120
Chromium	43.4[4]	26.9	0.5	43.4	20	75–125	80–120
Cobalt	50[11]	6.98	0.5	50	20	75–125	80–120

Metals (Preparation: SW 3050B; Analysis: Mercury SW 7471, all other metals SW 6010) (mg/kg)

Analyte	Risk-based Screening Value	El Toro Background Threshold[d]	Laboratory Reporting Limit	Project Decision Threshold[a]	Precision (RPD)	Accuracy (%R)[b]	
						MS/MSD	LCS
Copper	31.6(4)	10.5	0.5	31.6	20	75–125	80–120
Iron	NA	18,400	3	18,400	20	75–125	80–120
Lead	35.8(4)	15.1	0.3	35.8	20	75–125	80–120
Magnesium	NA	8,370	10	8,370	20	75–125	80–120
Manganese	300(12)	291	0.5	300	20	75–125	80–120
Mercury	0.180(4)	0.22	0.18	0.18	20	75–125	80–120
Nickel	22.7(4)	15.3	0.2	22.7	20	75–125	80–120
Potassium	NA	4,890	20	4,890	20	75–125	80–120
Selenium	5(13)	0.32	0.3	5	20	75–125	80–120
Silver	1(3)	0.539	0.5	1	20	75–125	80–120
Sodium	NA	405	100	405	20	75–125	80–120
Thallium	NA	0.42	0.4	0.42	20	75–125	80–120
Vanadium	NA	71.8	0.5	71.8	20	75–125	80–120
Zinc	121(4)	77.9	1	121	20	75–125	80–120

Notes:
mg/kg = milligrams per kilogram
µg/kg = micrograms per kilogram
LCS = laboratory control sample
USEPA = United States Environmental Protection Agency
MS = matrix spike
MSD = matrix spike duplicate
NA = not available
RPD = relative percentage of difference
%R = percent recovery
SW = Test Method Solid Waste (USEPA 1997)
* = calculated from TEF values as TEQ

[a] The Project Decision Threshold was established by comparing the Risk-Based Screening Value (when available) with the Laboratory Reporting Limit. Where no Risk-Based Screening Value is available, the Laboratory Reporting Limit is used. Where the Risk-Based Screening Value is higher than the Laboratory Reporting Limit, the Risk-Based Screening Value is used. Where the Risk-Based Screening Value is lower than the Laboratory Reporting Limit, the Laboratory Reporting Limit is used. For metals, established background threshold levels (95th quantile) have been used (BNI 1996).
[b] Laboratory-specific performance criteria.
[c] Analyzed using selective ion monitoring (SIM)
[d] Upper limit of background range (95th quantile), (BNI 1996)

Sources of risk-based screening values:
(1) Screening value calculated by the Great Lakes Water Quality Initiative (EPA, 1993a) and presented in Suter and Tsao (1996).
(2) Screening value calculated using the Equilibrium Partitioning (EqP) Method (EPA, 1993b) and a daphnid chronic toxicity value from Kuhn et al. (1989).
(3) Existing sediment screening criterion (Effects Range Low, or ERL, from Long et al., 1995).
(4) Existing sediment screening criterion (Consensus-based Threshold Effect Concentration, or TEC, from MacDonald et al., 2000).
(5) Screening value calculated using the Equilibrium Partitioning (EqP) Method (EPA, 1993b) and a daphnid chronic toxicity value from Scheubel (2001).
(6) Screening value calculated using the Equilibrium Partitioning (EqP) Method (EPA, 1993b) and a water quality criterion from Suter and Tsao (1996).
(7) Screening value calculated using the Equilibrium Partitioning (EqP) Method (EPA, 1993b) and a chronic toxicity value from Talmage et al. (1999).
(8) Screening value calculated using the Equilibrium Partitioning (EqP) Method (EPA, 1993b) and a daphnid chronic toxicity value from Griest et al. (1998).
(9) Existing sediment screening criterion (Effects Range Low, or ERL, from Long and Morgan, 1990).
(10) Screening value from interim criterion for in-water disposal of dredged sediments (Sullivan et al., 1985).
(11) Screening value from OMOE open water disposal criterion (Fitchko, 1989).
(12) Screening value from Non Polluted Sediment Quality Guidelines for USEPA Region 5 Harbour Classification (EPA, 1977).
(13) Existing sediment screening criterion (British Columbia Ministry of Environment, or BCMOELP, 1994).

6.3 PROJECT QA OVERSIGHT

Requirements for project quality assurance oversight are presented in Section 5.3 of the Final Work Plan for Phase II RI at Site 1 (Earth Tech 2001).

6.4 DATA VALIDATION AND USABILITY

Standards for chemical data validation and usability are presented in Section 5.4 of the Final Work Plan for Phase II RI at Site 1 (Earth Tech 2001).

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Appendix A
Responses to Regulatory Comments on Draft Work Plan Amendment and Draft Final Sampling and Analysis Plan Amendment

Document Title:

(1) Amendment No. 1 to Work Plan, Phase II Remedial Investigation, IRP Site 1, Explosive Ordnance Disposal Range, Former Marine Corps Air Station, El Toro, California, November 2002.

Reviewer: Sonce deVries, Ecological Risk Assessor, U.S. EPA Region 9, Email dated December 13, 2002

Comment No.	Section/ Page No.	Comment	Response
1.		As per your request, I have reviewed the above document to assess whether the sample plan appears adequate to characterize the Site 1 bermed retention pond for ecological risk.	Comment Noted
2.		The number of samples proposed does not appear adequate to establish whether there are contaminant concentrations in the pond which could adversely affect ecological receptors. My judgement is based on three facts: (1) this pond appears to cover a fair amount of ground (approximately 50 meters by 50 meters), (2) explosives often leave residues in particulate form (such as white phosphorus) and (3) my experience with explosives sampling in Alaska. Characterizing soils for explosives requires fairly intensive sampling and sediments potentially resuspended and transported by water requires even more intensive sampling. My experience with a number of sites in Alaska contaminated with exploded and unexploded ordnance with similar sampling problems leads me to suggest an intensive random sampling based on a grid which covers the entire pond from berm to berm. A number of samples should be collected from the surface (0 - 6") within each grid square and composited and subsampled for analysis. The subsurface should be sampled in the same fashion with the depth dependent on the depth of the known anomolies and/or the depth of past disking. Samples should also be collected under the anomolies identified in the pond.	There have been no detonation pits in the area that constitutes the ephemeral pond. The pond is upgradient from the portion of the site that was used for EOD training. This was confirmed by the use of geophysics, review of aerial photographs, and confirmed with personnel who conducted operations at the range. Therefore, there is a low likelihood of explosive components, or other associated contaminants, being present within the pond. The Guidance being cited by the USFWS and the EPA is inappropriate for the conditions found in the ephemeral pond and therefore out of context and not germane to the Navy's approach. The grid sampling and compositing being suggested is typically implemented within detonation pits, where the likelihood of particulates is high. In addition, a representative of the USFWS was disturbed over the level of intrusion experienced when the Navy conducted a geophysical survey with 100% coverage of the pond. The proposed intensive sampling would produce considerably more impact than the geophysical survey generated and would result in greater disturbance to the pond compared to the collection of discrete samples as specified in the subject document. The risk of causing harm to the fairy shrimp and intensive takings outweighs the benefit of collecting composite samples. The current sampling strategy offers a balance between minimizing disturbance, while still collecting adequate data from areas with the highest probability of having contamination. The current Navy proposed sampling strategy is consistent with the approach already approved by the BCT and performed in the initial phase of the remedial investigation for the site. Data obtained from the initial phase of the sampling at Site 1 confirms that the approach has been representative for the highest levels of contamination.

Document Title:

(1) Amendment No. 1 to Work Plan, Phase II Remedial Investigation, IRP Site 1, Explosive Ordnance Disposal Range, Former Marine Corps Air Station, El Toro, California, November 2002.

Reviewer: Sonce deVries, Ecological Risk Assessor, U.S. EPA Region 9, Email dated December 13, 2002

Comment No.	Section/ Page No.	Comment	Response
2, Continued			The greatest concentrations of contaminants (for the exception of TNT, with its solubility component) have been found directly under ordnance located in areas other than the pond. To adopt the recommendations in the EPA comment is to dismiss the trends established in the first phase of the RI. Furthermore, the comments call into question the validity of the approach already established and utilized at this site. Therefore, the Navy does not concur with the recommendation to conduct composite sampling within the pond. The Navy contends that Riverside Fairy Shrimp are present in the ephemeral pond and there are no signs that past activities at the EOD range adversely impacted the shrimp population. The Navy's proposed sampling will provide adequate data to establish whether EOD activities have impacted the Riverside fairy shrimp. In a June 10, 2003 meeting, the Navy agreed that, in addition to the discrete samples previously outlined, grid sampling would be acceptable to characterize the impact to the Riverside fairy shrimp. Due to a lack of contaminant thresholds for Riverside fairy shrimp (especially for explosives compounds), USFWS representatives suggested that reporting limits could be used as the criteria to evaluate impacts. Further discussions and responses to comments resulted in the Navy agreeing to collect composite samples for the explosives analysis only. See response to comment #1, for comments submitted by Nicole Moutoux on Powerpoint Presentation and accompanying email from Gordon Brown, dated January 13, 2004.
3.		The size of the grid and the number of samples can be negotiated with the Navy. I have reviewed the EPA and CRREL guidance provided to me by the FWS. A grid based on 10 to 20 foot squares with 4 - 6 samples composite and subsampled within each grid square appears to be the most appropriate.	See response to comment #2.

Document Title:

Page 1-4

Powerpoint presentation and accompanying email from Gordon Brown regarding IRP Site 1 pond sampling, January 7, 2004.

Reviewer: Nicole Moutoux, Project Manager, USEPA Region 9, Email dated January 13, 2004

Comment No.	Section/ Page No.	Comment	Response
1.		The grid cell size proposed in Figure 3 (Slide #10) appears Adequate and concurs with our recommendation the letter sent by Fish and Wildlife dated December 16, 2002. The composite samples should be for explosives only - Surface samples should be composited samples at all locations. Sample numbers shown as discrete samples on Figure 3 (Slide # 10) of the presentation should also be composite samples for explosives. For compositing the surface samples, we suggest that each grid cell be divided into quarters or sub-cells. There will be one sub-sample taken in each sub-cell. If the technician has no reason to believe that any part of the sub-cell is any more contaminated than any other, the sub-sample should be taken right in the middle of the sub-cell. If there is reason to believe that residue might be in one of the sub cells (old shell casing? dead grass?), they should sample in the suspected area of that sub-cell only. If the other 3 sub-cells of the same grid cell do not appear to be suspicious, sampling should still occur in the middle of them. This should give you a uniform sampling of the entire pond, except where there is reason to believe residue exists and you want to be sure to sample. For all other analytes - samples should be discrete samples and not composite. The Navy should provide center coordinates from each sample grid cell recorded in Universal Transverse Mercator (UTM) North American Datum (NAD) 1983 Zone 11 using a Global Positioning System (GPS) with a maximum sub-meter accuracy to enable these locations to be mapped.	There will be 16 grids that will be 30 feet by 30 feet. Surface samples will be collected from the centers of four subgrids within each grid and will be composited for analysis of explosives only. If there is any reason to believe that there may be contamination at any specific location, then the sample for that subgrid will be collected from the location (stain, metallic debris, etc.). Additionally, surface samples will be collected from the center of each of 13 grids for analysis of VOCs, SVOCs, TVPH, TEPH, explosives, perchlorate, and metals. For the remaining 3 grids, surface (0-15cm) and subsurface (5ft bgs) samples will be collected from the locations of the two geophysical anomalies and the lowest portion of the pond. All sampling locations will be surveyed by a California-licensed surveyor. Composite sample locations have been adjusted in order to collect as many of the samples as possible on the bottom portion of the pond, as opposed to the side portions and the top of the berm.
2.		Sample depths should be specified in the work plan, e.g., 0-15cm (surface); 15-45 cm (subsurface). Samples should not be composited from two different depth intervals, but at the same depth interval.	All composite samples will be collected from the surface (0-15 cm). Composite samples will not be collected from the subsurface due to the fact that the pond was not used as an active area for demolitions and is uphill and upwind from the northern and southern EOD ranges, where the demolitions took place. Based on the historical use of this area, it is anticipated that no subsurface contamination exists aside from potential contamination at the locations of the two anomalies and the lowest portion of the pond. Additionally, the intent of the investigation is to assess

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Powerpoint presentation and accompanying email from Gordon Brown regarding IRP Site 1 pond sampling, January 7, 2004.

Reviewer: Nicole Moutoux, Project Manager, USEPA Region 9, Email dated January 13, 2004

Comment No.	Section/ Page No.	Comment	Response
			impact of the pond on the Riverside fairy shrimp, an aquatic species. It is anticipated that surface and near-surface soil/sediment could affect the aquatic conditions in the very few instances of standing water in the pond area, but not subsurface soil/sediment.
3.		Gordon's email of 12/05/03 transmitting the Powerpoint presentation states that "Concisely stated, we are going to sample for a suite of constituents, including explosives but excluding VOCs and SVOCs, in the grid configuration previously discussed with you along with samples at the low point of the "pond" and underneath the two geophysical anomalies." However, slide # 9 of the Powerpoint presentation shows that all sampleswill be analyzed for VOCs, SVOCs, TVPH, TEPH, Explosives, Perchlorate, and Metals. VOCs and SVOCs should not be excluded from the analysis based on the analytical data results from the EOD range. An example of SVOCs found present at the EOD range include the following propellent components: Di-n-butyl phthalate (ug/kg) / N-nitrosodiphenylamine (ug/kg) LE162 113000 / 12300 LE163 27800 / 3500 LE167 30700 / 66700 LE169 30300 / 4000 LE174 15300 / 1300 LE187 41700 / 5300 Source: Interim Analytical Data Package Phase II Remedial Investigation IRP Site 1 Explosive Ordnance Disposal Range, Former Marine Corps Air Station, El Toro, California (Earth Tech 2003) In addition, not analyzing for SVOCs and VOCs would omit 2,4-Dinitrotoluene and 2,6-dinitrotoluene from the suite of compounds. The following results for 2,4-Dinitrotoluene were found in soils at the	Samples will be collected within each grid cell and analyzed for VOCs and SVOCs. All compounds of concern listed here are included in target analyte lists.

Page 3-4

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Powerpoint presentation and accompanying email from Gordon Brown regarding IRP Site 1 pond sampling, January 7, 2004.

Reviewer: Nicole Moutoux, Project Manager, USEPA Region 9, Email dated January 13, 2004

Comment No.	Section/ Page No.	Comment	Response
		EOD Range. Concentrations of 2,4-DNT Sample # / # feet BGS / Conc. (ug/Kg) LE 162 / 1.5 / 3,100 LE 167 / 1.5 / 7,000 LE 174 / 2 / 120 LE 187 / 2 / 1,600 LE 170 / 5 / 650 Range 120-7000 ppb or 0.120-7.0 ppm Source: Interim Analytical Data Package Phase II Remedial Investigation IRP Site 1 Explosive Ordnance Disposal Range, Former Marine Corps Air Station, El Toro, California (Earth Tech 2003) The email should be clarified to state that VOCs and SVOCs will be included in the analysis as shown in Slide # 9.	
3.		Toxicity testing should be one line of evidence along with soil/sediment and surface water.	Toxicity testing is proposed only if the soil/sediment concentrations indicate that one or more analytes exceed their respective decision threshold. In response to comment #4, for comments received from EPA in May 2004, toxicity testing will only be performed if the soil sampling results indicate maximum concentrations above the risk-based screening values. The methodology for the toxicity testing will be determined at a later date. The Final Phase II RI Work Plan (Earth Tech 2001) proposed that surface water samples be collected from the pond. However, no ponding or accumulation contributing to surface water flow has been observed (1999 to present) by Earth Tech. As per the Phase II RI Work Plan, if ponding is observed, then surface water samples will be collected from the pond.

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Powerpoint presentation and accompanying email from Gordon Brown regarding IRP Site 1 pond sampling, January 7, 2004.

Reviewer: Nicole Moutoux, Project Manager, USEPA Region 9, Email dated January 13, 2004

Comment No.	Section/ Page No.	Comment	Response
4.		Detection limits should be based on Eco-screening numbers. For explosives the detection limits for EPA Method 8330 for explosives are approximately 0.5 mg/kg for soil and 0.5 ug/l for water. These should be sufficient for ecological screening purposes.	Laboratory reporting limits will be used as decision thresholds for organic compounds (VOCs, SVOCs, TVPH, TEPH, and explosives) and perchlorate. For metals, the decision thresholds will be MCAS El Toro background ranges (BNI 1996). Subsequent discussions have lead to the use of risk-based screening values (where available). Please see response to comment #1, for comments submitted by EPA on the Draft Final Sampling and Analysis Plan, May 2004.
5.		Regarding Slide # 11. Every effort should be made to collect samples not only when the pond is dry, but when there is water in the pond during the rainy season.	Based on observations over the past 3 years, there is a low likelihood of having ponded water in the pond. Therefore, the Work Plan, by design, focuses on results based on samples collected during the dry season. In addition, if contaminants are detected, the toxicity testing would simulate and evaluate their effects on aquatic microorganisms.
6.		Finally, a workplan should be submitted.	A Draft Final Sampling and Analysis Plan Amendment of the original Work Plan is currently being developed and will be submitted for review soon.

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Pages 1-3

Draft Final Sampling and Analysis Plan Amendment No. 1, Phase II Remedial Investigation, IRP Site 1, Former Marine Corps Air Station, El Toro, California. March 2004.

Reviewer: Nicole Moutoux, Project Manager, USEPA Region 9, Memo dated May 19, 2004

Comment No.	Section/ Page No.	Comment	Response
1.	Section 3, Rationale for the Amendment, Page 3-2	It appears that use of reporting limits for organics is acceptable, however, the Navy should provide a table which shows that the reporting limits are comparable to sediment toxicity benchmarks for benthic invertebrates (Talmage et al., 1999, MacDonald et al, 2000, Lotufo et al. 2001).	Talmage et al. (1999) ecotoxicity thresholds were developed from toxicity values derived from studies for a wide number of aquatic or benthic organisms (invertebrates, fish, amphibians) and were intended to be used as guidance when no site-specific criteria existed. MacDonald et al. (2000) only provides consensus-based sediment screening values, while Lotufo et al. (2001) provides sediment screening values based on one marine and one estuarine benthic species. Fairy shrimp species are not sediment dwelling organisms while in the active part of their life cycle, and they would likely be subject to exposures to chemicals in the water column. Therefore, few of the screening values in the suggested literature are as applicable for screening purposes as those derived from Daphnid Chronic Values from Suter and Tsao (1996) or surface water quality criteria (whichever are lower). Table 6-1 has been revised and is enclosed with these responses. The revised table now includes risk-based screening values using more applicable literature than suggested (where appropriate), as well as laboratory reporting limits. The project decision threshold for each organic analyte has been determined by a comparison of the available values. Where no risk-based screening value is available through either literature or literature-based calculation, the laboratory reporting limit is used. Where the risk-based screening value is higher than the laboratory reporting limit, the risk-based screening value is used. Where the risk-based screening value is lower than the laboratory reporting limit, the laboratory reporting limit is used, as that value is the lowest concentration that the laboratory can reliably identify and quantify the analyte.
2.	Section 4.2, Decision Statement, Page 4-1	Use of background as screening numbers for metals is acceptable only if background values do not exceed literature-derived toxicity reference values (ie, MacDonald, et al, 2000). It appears that most background numbers would be protective, with the possible exception of Mercury and Cadmium. As recommended in comment number 1, please provide a table which makes the	Comment noted; see response to Comment No. 1, above. For metals, established background values are used as decision thresholds in the few cases where risk-based screening levels have not been established. Reporting limits

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Reviewer: Nicole Moutoux, Project Manager, USEPA Region 9, Memo dated May 19, 2004

Comment No.	Section/ Page No.	Comment	Response
		comparison of background values to the appropriate sediment invertebrate toxicity benchmarks.	for mercury and cadmium have been revised.
3.	Section 4.5, Decision Rule, Page 4-1	Use of mean concentration is not an acceptable way to screen for potential risk. Maximum concentrations should be used.	The decision rules will be revised to indicate that the maximum concentration from all samples will be used for screening purposes (Tier 1, Step 2 of the Navy's 3-tiered approach); subsequent data evaluation will use the RME (Tier 2, Step 3a of the Navy's 3-tiered approach).
4.	Section 4.5, Decision Rule, Page 4-2	EPA has concerns about the bioassays proposed for toxicity testing should the samples collected exceed screening values. However, in the interest of moving forward and collecting information as soon as possible, EPA suggests finalizing the approach for toxicity testing after the chemistry has been collected and evaluated.	Comment noted. The toxicity testing protocol and ASTM Method E1706-00$^{\varepsilon 2}$ will be removed from the document.
5.	Sections 4.7 and 5, Study Design and Field Sampling Plan, Pages 4-7 and 5-1	Comparison of bioassay results from the pond to results from a reference site is discussed however, there is no further discussion of where the reference site would be located. Prior to finalization of toxicity testing design, this reference site should be chosen.	Page 4-8 states, "One composite sample will be collected at a reference site (selected based on discussions with the BCT)". Text relating to a reference site will be removed from the document as the toxicity testing portion of the project will be deferred to a future Sampling and Analysis Plan if the results of the chemical analyses indicate that toxicity testing is necessary, with the data included into a Tier 2 BERA Study.

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Page 3-3

Draft Final Sampling and Analysis Plan Amendment No. 1, Phase II Remedial Investigation, IRP Site 1, Former Marine Corps Air Station, El Toro, California. March 2004.

Reviewer: Nicole Moutoux, Project Manager, USEPA Region 9, Memo dated May 19, 2004

Comment No.	Section/ Page No.	Comment	Response
6.	Section 4.7, Study Design, Page 4.7	Please provide justification for sampling at a depth of 5 feet as this may not be the appropriate depth to obtain ecologically relevant information. Consider instead sampling of a depth of 15-45 cm.	The 3 samples to be collected at 5 feet below ground surface are proposed in order to evaluate potential chemical contamination caused by the two geophysical anomalies, as well as potential contamination at the location of the lowest portion of the pond, near the outlet (assumed to be the area with the highest chemical contamination). Surface samples (0-15 cm) will be collected at all 3 sample locations. The Sampling and Analysis Plan will be revised to more clearly identify the purpose of these samples. The Sampling and Analysis Plan will be revised to indicate that the samples at the locations of the two geophysical anomalies will be collected at 5 feet below ground surface or just below the depth of the geophysical anomalies if it is determined that the anomalies are shallower than 5 feet below ground surface.

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Page 1-5

Draft Final Sampling and Analysis Plan Amendment No. 1, Phase II Remedial Investigation, IRP Site 1, Former Marine Corps Air Station, El Toro, California. March 2004.

Reviewer: Regina Donohoe, Ph.D., California Department of Fish and Game, Office of Spill Prevention and Response (OSPR), Memo dated May 13, 2004

Comment No.	Comment	Response
1.	DFG-OSPR would prefer that water samples be collected to evaluate impacts to the fairy shrimp. Given the lack of available water in the pond, we concur that soil sampling is the most feasible surrogate at this point in time. However, DFG-OSPR encourages the DoN to continually monitor for the presence of water in the retention pond and to collect water samples if the opportunity arises. Chemical analyses and toxicity testing should be performed on these water samples to more fully evaluate the risks to the fairy shrimp.	As stated in the response to comments from Nicole Moutoux on the Powerpoint presentation and accompanying email from Gordon Brown regarding IRP Site 1 pond sampling (included with the Draft Final Sampling and Analysis Plan Amendment), based on observations over the past 3 years, there is a low likelihood of observing water in the pond. Therefore, the Work Plan, by design, focuses on results based on samples collected during the dry season. The Navy has continually monitored the pond for the presence of water during the past 3 rainy seasons, and if ponding is observed during a future rain event, surface water samples will be collected for chemical analysis. The toxicity testing protocol and ASTM Method E1706-00$^{\varepsilon 2}$ will be removed from the document, and the text of the Sampling and Analysis Addendum will be revised to indicate that, should the maximum concentration of any target analyte exceed its respective risk-based decision threshold, then toxicity testing will be proposed (methodology to be determined at a later date), with the data included into a Tier 2 BERA Study.
2.	In order to determine if reporting limits for organics are protective thresholds for the fairy shrimp, they should be compared to toxicity benchmarks. This is difficult because no soil-based toxicity benchmarks are available for the fairy shrimp (i.e., water concentrations are normally used). As an alternative, reporting limits could be compared to sediment toxicity benchmarks for benthic invertebrates (e.g., Talmage et al., 1999; MacDonald et al, 2000; Lotufo et al., 2001). It is recommended that this type of analysis be included in the document to justify the decision thresholds. However, it appears that the listed reporting limits for organics are below available sediment invertebrate toxicity benchmarks.	Talmage et al. (1999) ecotox thresholds were developed from toxicity values derived from studies for a wide number of aquatic or benthic organisms (invertebrates, fish, amphibians) and were intended to be used as guidance when no site-specific criteria existed. MacDonald et al. (2000) only provides consensus-based sediment screening values, while Lotufo et al. (2001) provides sediment screening values based on one marine and one estuarine benthic species. Fairy shrimp species are not sediment dwelling organisms while in the active part of their life cycle, and they would likely be subject to exposures to chemicals in the water column. Therefore, few of the screening values in the suggested literature are as applicable for screening purposes as those derived from Daphnid Chronic Values from Suter and Tsao (1996) or surface water quality criteria (whichever are lower). Table 6-1 has been revised and is included with these responses. The revised table now includes risk-based screening values using

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Reviewer: Regina Donohoe, Ph.D., California Department of Fish and Game, Office of Spill Prevention and Response (OSPR), Memo dated May 13, 2004

Comment No.	Comment	Response
		more applicable literature than suggested (where appropriate), as well as laboratory reporting limits. The project decision threshold for each analyte has been determined by a comparison of the available values Where no risk-based screening value is available through either literature or literature-derived calculation, the laboratory reporting limit is used. Where the risk-based screening value is higher than the laboratory reporting limit, the risk-based screening value is used. Where the risk-based screening value is lower than the laboratory reporting limit, the laboratory reporting limit is used, as that value is the lowest concentration that the laboratory can reliably identify and quantify the analyte.
3.	DFG-OSPR has concerns about the feasibility/applicability of conducting the proposed C. *dubia* bioassays (7 day reproduction test) with rehydrated soil (i.e., 1:4 ratio of soil to water) from the retention pond. However, in the interest of expediting chemical sampling, DFG-OSPR proposes that the experimental design for the bioassay be finalized after the chemical analyses are complete and the need for toxicity testing is identified. At that point in time, we can address whether the 1:4 soil to water ratio is reflective of the conditions that might be expected to occur at Site 1 when the pond contains water (i.e., does this ratio reflect a worst case scenario?). A second concern that would need to be addressed is the ion tolerance of C. *dubia*. Given that evaporation has occurred in the pond, there may be elevated concentrations of inorganic ions that might impair reproduction in C. *dubia*. Researchers have found that water conductivity greater than 2000 uS/cm can adversely affect C. *dubia* reproduction (personal communication, Victor deVlaming, University of California at Davis, Aquatic Toxicology Laboratory, April 22, 2004; Goodfellow et al., 2000; Mount et al., 1997). Therefore, it may be prudent to collect a preliminary soil sample, hydrate it as directed by the method, and evaluate conductivity levels. If bioassays are feasible and toxicity is observed, a toxicity identification evaluation procedure (e.g., U.S. EPA, 1993) may be utilized to evaluate the type of contaminants (i.e., major ions or nitroaromatics) that may be causing adverse effects. If bioassays with C. *dubia* are not	The toxicity testing protocol and ASTM Method E1706-00$^{\varepsilon 2}$ will be removed from the document, and the text of the Sampling and Analysis Addendum will be revised to indicate that, should the maximum concentration of any target analyte exceed its respective decision threshold, then toxicity testing will be proposed (methodology to be determined at a later date).

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Reviewer: Regina Donohoe, Ph.D., California Department of Fish and Game, Office of Spill Prevention and Response (OSPR), Memo dated May 13, 2004

Comment No.	Comment	Response
	feasible, an alternative bioassay will have to be selected.	
4.	Utilizing the mean concentration of an analyte is not a protective decision rule (page 4-2), especially if the data is not normally distributed. It is recommended that a maximum concentration be utilized as the decision rule. Examination of the data distribution will assist in identifying the type of further investigation that may be required.	The decision rules will be revised to indicate that the maximum concentration from all samples will be used for screening purposes (Tier 1, Step 2 of the Navy's 3-tiered approach); subsequent data evaluation will use the RME (Tier 2, Step 3a of the Navy's 3-tiered approach).
5.	It is assumed that soil concentrations will be reported on a dry weight basis. Please clarify this in the report.	The following sentence will be added to Section 6.2, "Soil concentrations will be reported on a dry weight basis".
6.	Potential comparison of bioassay results from the retention pond soil to results from a reference sediment is mentioned (pages 4-7 and 5-1). However, there is no discussion of where this reference sediment would be collected. The location and rationale for reference site selection needs to be provided. However, reference site selection may be discussed during the finalization of the toxicity testing design (see comment 3).	Page 4-8 states, "One composite sample will be collected at a reference site (selected based on discussions with the BCT)". Text relating to a reference site will be removed from the document as the toxicity testing portion of the project will be deferred to a future Sampling and Analysis Plan if the results of the chemical analyses indicate that toxicity testing is necessary (in a Tier 2 BERA Study).

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Reviewer: Regina Donohoe, Ph.D., California Department of Fish and Game, Office of Spill Prevention and Response (OSPR), Memo dated May 13, 2004

Comment No.	Comment	Response
7.	On page 4-7, please clarify why a depth of 5 feet below ground surface (bgs) was selected for sampling. Unless this is the depth of the geophysical anomaly, it is recommended that a more biologically relevant depth be selected.	The three samples to be collected at 5 feet below ground surface are proposed in order to evaluate potential chemical contamination caused by the two geophysical anomalies, as well as potential contamination at the location of the lowest portion of the pond, near the outlet (assumed to be the area with the highest chemical contamination). This depth is necessary to help establish the nature and extent of contamination. The 5 foot samples are not considered representative of the depth that fairy shrimp are present. Surface samples (0-15 cm) will be collected at all 3 sample locations. These samples will be used to represent the exposure concentration in the fairy shrimp screening risk assessment. The Sampling and Analysis Plan will be revised to more clearly identify the purpose of these samples. The Sampling and Analysis Plan will be revised to indicate that the samples at the locations of the two geophysical anomalies will be collected at 5 feet below ground surface or just below the depth of the geophysical anomalies if it is determined that the anomalies are shallower than 5 feet below ground surface.
8.	If bioassay samples are collected, split samples should be taken for analytical chemistry so that toxicity test results can be correlated to analyte levels in the soil. Soil samples should not be composited for toxicity testing.	Section 5.1 states, "A California Licensed surveyor will survey grid centers", which will allow the project team to resample in the same locations if necessary. The holding time for samples to be analyzed for toxicity is much too short to allow for split sampling. Toxicity test should be performed within 7 days of sample collection. The text of the Sampling and Analysis Addendum will be revised to indicate that, should the maximum concentration of any target analyte exceed its respective decision threshold, then toxicity testing will be proposed (methodology to be determined at a later date), with the data included into a Tier 2 BERA Study.

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Reviewer: Regina Donohoe, Ph.D., California Department of Fish and Game, Office of Spill Prevention and Response (OSPR), Memo dated May 13, 2004

References Provided by California Department of Fish and Game

Goodfellow, W.L., L.W. Ausley, D.T. Burton, D.L. Denton, P.B. Dom, D.R. Grothe, M.A. Heber, T.J. Norberg-King and J.H. Rodgers, Jr. Major ion toxicity in effluents: a review with permitting recommendations. Environ. Toxicol. Chemistry 19: 175-182.

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MacDonald, D.D., C.G. Ingersoll, T.A. Berger. 2000. Development and Evaluation of Consensus-Based Sediment Quality guidelines for Freshwater Ecosystems. Arch. Enciron. Contam. Toxicol. 39: 20-31.

Mount, D.R., D.D. Gulley, J.R. Hockett, T.D. Garrison and J.M. Evans. 1997. Statistical models to predict the toxicity of major ions to *Ceriodaphnia dubia, Daphna magna* and *Pimephales promelas.* Environ. Toxicol. Chemistry 16: 2009-2019.

Talmage, S.S., Opresko, D.M., Maxwell, C.J., Wesch, C.J.E., Cretella, F.M. Reno, P.H., and F.B. Daniel. 1999. Nitroaromatic munition compounds: Environmental effects and screening values. Rev. Environ. Contam. Toxicol, 161: 1-156.

U.S. Environmental Protection Agency (U.S. EPA). 1992. *Toxicity Identification Evaluation: Characterization of Chronically Toxic Effluents, Phase I*, EPA/600/6-91/005F. U.S. Environmental Protection Agency, Office of Research and Development, Environmental Research Laboratory, Duluth, MN.

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Draft Final Sampling and Analysis Plan Amendment No. 1, Phase II Remedial Investigation, IRP Site 1, Former Marine Corps Air Station, El Toro, California. March 2004.

Reviewer: Andrew Yuen, Deputy Field Supervisor, U.S. Fish and Wildlife Service, Memo dated May 25, 2004

Comment No.	Section/ Page No.	Comment	Response
GENERAL COMMENTS			
1.		Our objective for sampling the Explosive Ordnance Disposal (EOD) Pond remains to assist the Navy in the collection of necessary data to assess potential risk, if any, to the federally endangered Riverside fairy shrimp (*Streptocephalus woottoni*) inhabiting the EOD Pond and to ensure that potential effects to listed species are avoided and/or minimized during remedial activities. Therefore, our goal is to ensure that data collected will be useful in assessing risk to the Riverside fairy shrimp and other ecological receptors utilizing the area. Working with our partners and co-trustees such as the Department of Defense (DOD) is essential if we are to achieve our long-term goal for recovery of this federally listed species.	Comment noted.

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Reviewer: Andrew Yuen, Deputy Field Supervisor, U.S. Fish and Wildlife Service, Memo dated May 25, 2004

Comment No.	Section/ Page No.	Comment	Response
2.	Literature Summary and Review	The Service has summarized below some ecological benchmarks and literature derived values based on toxicity reference values to be evaluated with regard to the ecological risk assessment and the toxicity test results.	Navy has reviewed the benchmarks and literature-derived values and evaluated their appropriateness. The sediment quality thresholds referred to were largely developed from toxicity values derived from studies for a wide number of aquatic or benthic organisms (invertebrates, fish, amphibians) and were intended to be used as guidance when no site-specific criteria existed. Site-specific criteria do exist for the IRP Site 1 pond, as the Riverside Fairy Shrimp is the only aquatic species of concern. Fairy shrimp species are not sediment dwelling organisms while in the active part of their life cycle, and they would likely be subject to exposures to chemicals in the water column. Therefore, few of the screening values in the suggested literature are as applicable for screening purposes as those derived from Daphnid Chronic Values from Suter and Tsao (1996) or surface water quality criteria (whichever are lower). Table 6-1 has been revised and is included with these responses. The revised table now includes risk-based screening values using more applicable literature than suggested (where appropriate), as well as El Toro Background thresholds (for metals), and laboratory reporting limits. The project decision threshold for each analyte has been determined by a comparison of the available values Where no risk-based screening value is available through either literature or literature-derived calculation, the laboratory reporting limit is used. Where the risk-based screening value is higher than the laboratory reporting limit, the risk-based screening value is used. Where the risk-based screening value is lower than the laboratory reporting limit, the laboratory reporting limit is used, as that value is the lowest concentration that the laboratory can reliably identify and quantify the analyte.

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Reviewer: Andrew Yuen, Deputy Field Supervisor, U.S. Fish and Wildlife Service, Memo dated May 25, 2004

Comment No.	Section/ Page No.	Comment	Response
3.	Benchmarks	Sediment quality benchmarks (SQBs) and water quality criteria have been derived for a limited number of munition compounds. Talmage et al. (1999) reported SQBs for sediment (mg/kg_{oc}) and water quality criteria for 2,4,6-trinitrotoluene (TNT), hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX), octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX), 1,3,5-trinitrobenzene (TNB), and 2-amino-4,6-dinitrotoluene (2-ADNT). Hovatter et al. (1997) also reported SQBs (mg/kg_{oc}) and aquatic toxicity for these munitions compounds. Tables 1 and 2 summarize these values reported by Talmage et al. (1999) and Hovatter et al. (1997) (Enclosure 1).	Navy has reviewed the benchmarks and literature-derived values and evaluated their appropriateness. Table 6-1 has been revised and is included with these responses. The revised table now includes risk-based screening values using more applicable literature than suggested (where appropriate), as well as El Toro Background thresholds (for metals), and laboratory reporting limits. The project decision threshold for each analyte has been determined by a comparison of the available values Where no risk-based screening value is available through either literature or literature-derived calculation, the laboratory reporting limit is used. Where the risk-based screening value is higher than the laboratory reporting limit, the risk-based screening value is used. Where the risk-based screening value is lower than the laboratory reporting limit, the laboratory reporting limit is used, as that value is the lowest concentration that the laboratory can reliably identify and quantify the analyte.

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4.	Explosives	Water and soil exposures to military-unique explosives have caused lethal and subleathal toxicity to fish and invertebrates (Talmage et al. 1999). Limited studies have been conducted on the biological effects of sediment-associated nitroaromatic and cyclonitramine compounds to benthic invertebrates. Earlier studies focused on the toxicity of explosives to marine organisms. Survival of the estuarine amphipod by nitroaromatics (2,4-diaminonitrotoluene [2-4-DANT] and TNB) at sediment concentrations as low as 200 µg/g (dw) (Lotufo et al. 2001). For 2-4-DANT, survival of *L. plumulosus* was significantly decreased at concentrations of 100 µg/g (dw) (Lutofo et al. 2001). Green et al. (1999) evaluated the chronic toxicity of TNT to the marine polychaete *Neanthes arenaceodentata* and *L. plumulosus*. Growth and reproduction were significantly reduced at TNT tissue concentration of 10 µg/g (ww) and 6.3 µg/g (ww) in L. plumulosus, respectively. Survival was significantly reduced at a tissue concentration of 61 µg/g (ww) TNT in *N. arenaceodentata* and 6.3 µg/g (ww) in *L. plumulosus* (Green et al. 1999). Recent studies have been conducted by Steevens et al. (2002) that focus on the toxicity of explosives to two freshwater invertebrates, the midge *Chironomus tetans* and the amphipod *Hyallela azteca*. Survival of *C. tetans* exposed to TNT, TNB, and 2,4-DANT was reducted at sediment concentrations as low as 200 µg/g (dw). *H. azteca* was more sensitive than *C. tetans* and significant reduction in survival occurred at concentrations of 50, 100, and 200 µg/g (dw) of TNT, TNB, and 2,4-DANT, respectively. Their studies also indicate that organisms exposed to explosives at contaminated sites may be affected at concentrations less than 25 µg/g (dw) through hormetic growth enhancement and at higher concentrations through increased mortality.	Comment noted. As detailed in the comments, studies on the effects of explosives on various aquatic organisms are ongoing and may prove useful in establishing benchmark values. However, the studies cited cannot be used as definitive screening criteria for the Riverside fairy shrimp.

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5.	Metals	Metals that may be associated with testing and firing munitions and/or detonations of explosives include lead, mercury, chromium, cadmium, zinc, and copper (U.S. EPA 2002; Thiboutot et al. 2002; http://www.epa.gov/reg3hwmd/bfs/regional/industry/ordnance.htm). Ahsanullah et al. (1981) conducted metal toxicity studies on the sediment dwelling shrimp, *Callianassa australiensis*. Values of 1.15, 0.49, and 0.19 mg/L were reported for the 14-day LC_{50} for zinc, cadmium, and copper, respectively (Ahsanullah et al. 1981). Mizutani et al. 91991) studied the uptake of lead, cadmium, and zinc by the fairy shrimp, *Branchinecta longiantenna*. Their results showed that fairy shrimp survived at much higher tissue concentrations for lead than for zinc and cadmium. Estimated lethal doses were 20, 1.2-2.4, and 0.4-1.4 mg/kg (ww) for lead, zinc, and cadmium, respectively. Some background values for metals (e.g., cadmium and mercury) proposed to be used as Project Decision Threshold values shown in Table 6-1 or the subject work plan exceed some toxicity reference values, sediment quality guidelines, and sediment quality benchmarks that have been developed for screening freshwater ecosystems and hazardous waste sites (MacDonald et al. 2000).	Comment noted. However, toxicity data derived from studies using sediment-dwelling species or with tissue concentrations are not relevant to the exposure pathways for the Riverside fairy shrimp. In addition, where detonations have not been conducted in the bermed area, the presence of metals in the context of deposition from explosive mechanisms is not at issue. Table 6-1 has been revised and is included with these responses. For metals, established background values are used as decision thresholds in the few cases where risk-based screening levels have not been established. Reporting limits for mercury and cadmium have been revised.
6.	Perchlorate	Perchlorates are a common chemical component of military energetic materials (U.S. EPA 2002). Rocket propellant binders commonly consist of ammonium perchlorate (Thiboutot et al. 2002). Recent studies show that perchlorate inhibits development and metamorphosis in aquatic species. Goleman et al. (2002) showed that exposure to perchlorate concentrations in the parts-per-billion range inhibited metamorphosis in amphibians. They further concluded that perchlorate contamination may pose a threat to normal development and growth in natural amphibian populations. Johnson et al. (1999) showed that the dermal route of exposure to nitroaromatics in soil may be an important route of exposure for some terrestrial amphibians.	Exposures and responses to chemicals by amphibians are not relevant to the Riverside fairy shrimp.

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Comment No.	Section/ Page No.	Comment	Response
SPECIFIC COMMENTS			
1.	Page 3-2	Page 3-2 states, "...USFWS representatives suggested that laboratory reporting limits could be used for decision criteria for further action." Please revise the sentence to indicate that the Service recommended using detection limits for explosives and ecological screening criteria for metals.	The text will be revised to state that the Service recommended, "...using reporting limits for explosives and ecological screening criteria for metals."
2.	Page 4-1	Decision Statement: The Service recommended using detection limits, not reporting limits, for explosives and ecological screening criteria for metals rather than background levels for metals. The Service would agree to using the Navy's Project Decision Thresholds (reporting limits for organics and background levels for metals) if the values do not exceed literature-derived toxicity reference values associated with adverse effects on invertebrates. As previously noted, background levels proposed for Project Decision Threshold values for cadmium and lead exceed sediment quality guidelines developed by MacDonald et al. (2000). Therefore we recommend using the Threshold Effects Concentrations (TEC) of 0.99 mg/L and 0.18 mg/L, for cadmium and mercury, respectively as Project Decision Thresholds (MacDonald et al. 2000).	a) The term detection limits implies the USEPA Method Detection Limit (MDL) (40 CFR 136). The method detection limit is recognized in the analytical chemistry community as a statistical construct that has very little relationship to the "real" world. It is an approximation of the value that a laboratory might see under ideal conditions. (On a side note, there is currently a USEPA Proposed Rule (Federal Register, March 12, 2003) that would significantly revise the approach for determining and reporting the MDL.) The term "reporting limit" is used by the laboratory and in this document to reflect the a) the level at which, if present, the laboratory can reliably detect and quantify with reasonable precision and b) the level at which, if not present, the laboratory is confident that the analyte is not there. In accordance with the Contract Laboratory Protocol, the laboratory will report any detection below the reporting limit but above the MDL. However, that value is qualified as estimated as the precision exceeds the standards (i.e. duplicates at that level are likely to be in excess of the acceptance limits). For planning purposes, the reporting limit is used as the value to evaluate whether the analysis will achieve the data objective. b) Table 6-1 has been revised and is included with these responses. The revised table now includes risk-based screening values using more applicable literature than suggested (where appropriate), as well as laboratory

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			reporting limits. The project decision threshold for each analyte has been determined by a comparison of the available values. Where no risk-based screening value is available through either literature or literature-derived calculation, the laboratory reporting limit is used. Where the risk-based screening value is higher than the laboratory reporting limit, the risk-based screening value is used. Where the risk-based screening value is lower than the laboratory reporting limit, the laboratory reporting limit is used, as that value is the lowest concentration that the laboratory can reliably identify and quantify the analyte. c) The revised Table 6-1 is included with these responses. For metals, established background values are used as decision thresholds in the few cases where risk-based screening levels have not been established. Reporting limits for mercury and cadmium have been revised. Consistent with both EPA and Navy protocols, the contribution to risk for naturally occurring compounds within background concentrations will be quantified. However, if the metals concentrations are within background, the Navy will conclude that the risk due to metals is not attributable to site activities and therefore no response action is warranted based on metals concentrations.
3.	Page 4-2	Decision Rule: The Service recommended using the maximum, not the mean concentration for the screening level ecological risk assessment (SLERA) at the EOD Pond. Consistent with EPA guidance, the maximum concentrations of contaminants measured at the site having complete pathways should be used to estimate exposure for the SLERA (U.S. EPA 1997; 2001).	The decision rules will be revised to follow both EPA and Navy guidance on data evaluation. This will include the evaluation of maximum concentrations for screening and the use of RME concentrations for subsequent risk evaluations.

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4.	Page 4-5	Decision Rule. As proposed in the work plan, toxicity testing would be conducted if the mean concentrations of target analytes exceed the Project Decision Threshold values. The Service would agree with this decision rule for toxicity testing if (1) maximum rather than mean concentrations of any target analyte exceeds the respective Project Decision Threshold value, and (2) the Project Decision Threshold value does not exceed literature-derived toxicity reference values associated with adverse effects on invertebrates.	The decision rules will be revised to indicate that the maximum concentration from all samples will be used, rather than the mean concentration. Table 6-1 has been revised and is included with these responses. The revised table now includes risk-based screening values using suggested literature (where appropriate), as well as laboratory reporting limits. The project decision threshold for each analyte has been determined by a comparison of the available values Where no risk-based screening value is available through either literature or literature-derived calculation, the laboratory reporting limit is used. Where the risk-based screening value is higher than the laboratory reporting limit, the risk-based screening value is used. Where the risk-based screening value is lower than the laboratory reporting limit, the laboratory reporting limit is used, as that value is the lowest concentration that the laboratory can reliably identify and quantify the analyte.

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5.	Page 4-7	Study Design: We previously recommended that surface (0-15 cm) and subsurface (15-45 cm) soil samples be collected within each grid. In addition to the surface sample (0-15 cm), please consider collecting a subsurface soil sample at 15-45 cm. Beneath an anomaly, or hot spot, we also recommend that a sample be collected in several increments in a continuous vertical profile over the first meter per the guidance for characterizing sites with contaminated explosives (Thiboutot et al. 2002). We believe this recommended approach will yield more ecologically relevant data for assessing risk(s) to the Riverside fairy shrimp.	Although the Final Phase II Remedial Investigation Work Plan (Earth Tech 2001) did propose surface water sampling in the pond area (unfortunately, surface water has not been observed since the Phase II RI field activities were initiated in 2002.), it did not propose any soil investigation for the bermed retention pond as there was no indication that EOD training activities might have impacted the pond soil. This is still the case. The primary purpose of this investigation is to assess whether adverse impacts to the Riverside fairy shrimp may occur or are occurring as a result of exposure to contamination due to the use of Site 1 as an EOD range. Because the Riverside fairy shrimp is an aquatic organism, it is primarily exposed to chemicals partitioned from the surface soil (0-15 cm) into the water column. Therefore, subsurface samples (15-45 cm) will not be collected, with the exception of the locations of the two anomalies and the lowest portion of the pond, where samples will be collected at up to 5 feet below ground surface. The toxicity testing protocol and ASTM Method E1706-00$^{\varepsilon 2}$ will be removed from the document, and the text of the Sampling and Analysis Addendum will be revised to indicate that, should the maximum concentration of any target analyte exceed its respective decision threshold, then toxicity testing will be proposed (methodology to be determined at a later date), with the data included into a Tier 2 BERA Study.

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6.	Page 4-8	Soil Sampling for Toxicity Testing: As stated on Page 4-7, Block 12 lies in the lowest portion of the EOD Pond and has the highest potential for accumulation of contaminants, and Blocks 9 and 10 contain the geophysical anomalies. In addition to the blocks proposed for soil or dry sediment toxicity testing, we recommend blocks 9 and 10 be sampled due to the documented presence of geophysical anomalies. Collection of samples for toxicity testing should also be based on the initial EOD pond soil results. Soil samples for toxicity testing should be collected from those sample sites that exceed the Project Decision Threshold values as described above. While the Service supports compositing samples for explosive analysis as described on Page 5-1, individual samples, not composite samples should be collected from each block for toxicity testing.	As the exposure route of the Riverside fairy shrimp is ponded water that potentially contacts soil from all portions of the pond, it is appropriate to collect sediment from the areas that have the highest potential for contamination (Blocks 11, 12, 15, and 16). Those blocks are within the lowest portion of the pond and they lie between the geophysical anomalies and the outlet to the pond. The exposure scenario for the pond is that water enters the pond via runoff and direct deposition. These mechanisms contribute to substantial mixing and since the main route of exposure is to dissolved constituents, it is reasonable that a composite sample is representative of the exposure. In addition, there is no evidence that there were explosive operations within the pond. The current understanding is that if there are any contaminants in the pond, they were either washed in or perhaps are the result of "kick-outs". The toxicity testing protocol and ASTM Method E1706-00$^{\varepsilon 2}$ will be removed from the document, and the text of the Sampling and Analysis Addendum will be revised to indicate that, should the maximum concentration of any target analyte exceed its respective decision threshold, then toxicity testing will be proposed (methodology to be determined at a later date), with the data included into a Tier 2 BERA Study.

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Comment No.	Section/ Page No.	Comment	Response
7.	Page 4-8	Study Design: Studies are being conducted to investigate the effects of contaminants to fairy shrimp. The University of San Diego, Biology Department, conducted toxicity studies of pesticides to the San Diego fairy shrimp, *Brachinecta sandiegonensis*. The University of California Davis, Department of Environmental Toxicology, investigated the presence of pesticides in vernal pools to evaluate toxicity of pesticides to endemic vernal pool biota such as the vernal pool fairy shrimp. Other studies that have been conducted by the Department of the Navy include taxonomic identification of fairy shrimp at Installation Restoration Site 10, Radio Receiving Facility near Imperial Beach, California. Lutufo et al. (2001) conducted toxicity testing of sediment-associated nitroaromatic and cyclonitramine compounds to benthic invertebrates at U.S. Department of the Army, Engineer Research and Development Center (ERDC), Waterways Experiment Station, Vicksburg, Mississippi. The Service has been consulting with Dr. Lotufo regarding his sediment toxicity studies, and we are presently seeking funding to support the Navy's efforts on toxicity studies, if warranted, at the site. Based on ERDC's capability and experience in conducting sediment toxicity testing of nitroaromatic and cyclonitramine compounds, we recommend the Navy contact ETDC to conduct sediment toxicity testing using Riverside fairy shrimp. Toxicity studies with formulated insecticides showed that standard tests with *Daphnia magna* may have little or no relation to the toxicity of the compounds to the fairy shrimp *Streptocephalus sudanicus* (Lahr et al. 2001). Therefore, we believe that using the Riverside fairy shrimp or a suitable surrogate fairy shrimp as the test organism would provide more useful and meaningful data for the risk assessment and eliminate uncertainties associated with a surrogate test organism such as *D. magna* as proposed in the subject work plan. We will facilitate the Navy's efforts and will seek funding to help support this testing.	The toxicity testing protocol and ASTM Method E1706-00$^{\varepsilon 2}$ will be removed from the document, and the text of the Sampling and Analysis Addendum will be revised to indicate that, should the maximum concentration of any target analyte exceed its respective decision threshold, then toxicity testing will be proposed (methodology to be determined at a later date), with the data included into a Tier 2 BERA Study. Should toxicity become an issue, the BCT and USFWS representatives will be included in the decision process as to how to proceed with the tests.
Proposed Alternate Toxicity Testing			
1.	Appendix B	Please consider contacting Dr. Lotufo for ERDC's sediment toxicity testing protocol for toxicity testing using the Riverside fairy shrimp as the test organism. We recommend similar toxicity testing to the	The objective of this investigation is to assess whether Navy activity at the site has resulted in contamination that would affect the listed species that may be present. The investigation proposed by the Service appears to generate

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		following: **Toxicity Testing of Field Samples** Soil or dry sediment samples collected from the EOD Pond will be shipped to ERDC-Vicksburg to be used in preparation of elutriates (USEPA/USACE 1998). The elutriate water will by analyzed for contaminants of potential concern (e.g., TNT, 2,4-dinitrotoluene, RDX, HMX, Di-n-butyl phthalate, N-nitrosodiphenylamine, cadmium, zinc, mercury, and lead). The elutriate water would then be used to determine the potential biological effects of site soils to *S. wootioni* using 96-h toxicity test methods described in Lahr et al (2001). If mortality occurs, toxicity tests will be conducted using a dilution series of the elutriate water. **Toxicity of Single Compounds to Riverside Fairy Shrimp** Single compound exposures should be conducted to interpret toxicity test results from field-collected samples and to generate a toxicity database for the Riverside fairy shrimp. For each contaminant of concern, reagent grade chemicals would be dissolved in reconstituted water and diluted serially. Two 96-h toxicity tests (Lahr et al. 2001) would be conducted using S. woottoni for each compound. The first test (range-finder) would be used to determine appropriate exposure concentrations to use in the definitive test, which will generate toxicity reference values. Tests would require daily water renewals and chemical analyses of the exposure solutions to confirm target concentrations. Toxicity data would be used in the calculation of no observable adverse effect concentration (NOAEC), lowest observable adverse effect concentration (LOAEC), the median lethal concentration (causing mortality in 50 percent of the exposed population or EC50) for each test. Toxicity reference values can be compared to compound concentrations in the site elutriate water or water samples from temporary ponds to determine potential for biological effects to *S. woottoni*. We seek to partner with the Navy on toxicity testing of this type to obtain meaningful data for the Riverside fairy shrimp. We seek the Navy's support in this effort and would like to further discuss this opportunity with the Navy.	data without resolving the question of whether there is a problem within the pond. If the Service would like to partner with the Navy in these research efforts, there has to be an identifiable outcome that achieves the Navy mission. The Navy originally recommended going directly to toxicity testing as the Service and the other commenters were unable to agree to decision thresholds for direct chemical testing. The chemical testing was agreed to only if it would offer an outcome that would lead to a decision, in this case whether or not to conduct a toxicity assessment. The toxicity testing protocol and ASTM Method E1706-00$^{\varepsilon 2}$ will be removed from the document, and the text of the Sampling and Analysis Addendum will be revised to indicate that, should the maximum concentration of any target analyte exceed its respective decision threshold, then toxicity testing will be proposed (methodology to be determined at a later date), with the data only included into a Tier 2 BERA Study.

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Document Title:

Response to Comments, Draft Final Sampling and Analysis Plan Amendment No. 1, Phase II Remedial Investigation, IRP Site 1, Former Marine Corps Air Station, El Toro, California. August 2004.

Reviewer: Nicole Moutoux, Project Manager, USEPA Region 9, Email dated August 31, 2004

Comment No.	Section/ Page No.	Comment	Response
GENERAL COMMENTS			
1.		There are uncertainties associated with the use of the equilibrium partitioning method to establish sediment screening criteria. Additionally, there is a wide range in the toxicity benchmarks that have been published for explosives, varying by several orders of magnitude. The Navy has selected screening benchmarks that are above those modeled by Talmadge et al. for explosives and below several values derived empirically via bioassays. These uncertainties should be kept in mind when viewing the chemical analyses results that will be generated according to the Site 1 Sampling and Analysis Plan.	Comment noted. All toxicity values, however derived, inherently contain uncertainty. The uncertainties will be addressed in the ecological risk assessment. Please see our July 2, 2004 correspondence with Dr. Talmage documented in the attached phone log.
SPECIFIC COMMENTS			
1.	Comment Number 6, Page 10 of 15	Should the toxicity testing protocol be implemented, all parties would like to coordinate with the Navy on the testing protocol and the locations for the sample sites from the EOD pond.	Comment noted. If the results of the sediment screening indicate a need for toxicity testing, then the methodology will be proposed in a subsequent Sampling and Analysis Plan Addendum and all parties will have the opportunity to provide input.
2.	Table 6-1	EPA Method 8330 for explosives includes the analysis of 2,4-diamino-6-nitrotoluene and 2,4-diamino-4-nitrotoluene. These degradation products of 2,4,6-trinitrotoluene should be added to the analyte list in Table 6-1.	It is assumed that the compounds in question are 2,4-diamino-6-nitrotoluene and 2,6-diamino-4-nitrotoluene (the last line mentions 2,4-diamino-4-nitrotoluene, assumed to be a typographical error). These two compounds have been identified as by-products of aerobic and anaerobic decomposition of TNT, but are **not** listed in USEPA Method 8330 as target analytes (http://www.epa.gov/epaoswer/hazwaste/test/pdfs/8330.pdf) Revision 0, Sept 1994. The compounds do have similar functional groups and would be expected to be detectable by this method. The Navy will add these new target analytes; however, in the absence of method development data, the reporting limits are estimated to be above the toxicity thresholds. This may limit the usefulness of the data in evaluating impacts to the Riverside fairy shrimp within the pond area.

Document Title:

Navy's Response to Review Comments of August 2004, to the Draft Final Sampling and Analysis Plan Amendment No. 1, Phase II Remedial Investigation, IRP Site 1, Former Marine Corps Air Station, El Toro, California. March 2004.

Reviewer: Andrew Yuen, Deputy Field Supervisor, U.S. Fish and Wildlife Service, Memo dated August 31, 2004

Comment No.	Section/ Page No.	Comment	Response
RESPONSE TO REVIEW COMMENTS			
1.	Comment Number 2, Page 2 of 15	Please explain or provide references regarding the statement that site-specific criteria exists for IRP Site 1 pond with the Riverside Fairy Shrimp as an ecological receptor. Toxicity data for the Riverside fairy shrimp regarding the contaminants of concern relating to the EOD pond is non-existent. We agree that Riverside fairy shrimp would likely be exposed to chemicals in the water column. While Riverside fairy shrimp may not be sediment dwelling organisms, a part of their life cycle is spent in the wet or dry sediment/soil of vernal pools. Anostracans such as San Diego fairy shrimp and Riverside fairy shrimp hatch from eggs (cysts) during the aqueous phase of their life cycle. Not all eggs hatch during a single filling cycle of the pool. There will be a random sample that hatches at any given time while others remain unhatched in the pool sediment. The unhatched eggs remain dormant and continue to exist during the nonaqueous phase and are often referred to as a cyst bank remaining in the sediment during the drying period of the pool. A portion of eggs from the cyst bank will hatch during the next filling cycle. This phenomenon is known as bet-hedging to ensure the existence of the species and thus avoid extirpation. Fairy shrimp that hatched during the aqueous phase will also produce desiccation resistant cysts which are left in the drying mud to hatch in future water accumulations in the pool (Simovich and Hathaway 1997). When eggs do hatch, the immature fairy shrimp spend much of their time at the sediment-water interface in contact with the wet sediment. As they mature, they spend more time in the water column. Therefore, there is a significant exposure pathway to the Riverside fairy shrimp to potential contaminants that may be present in the wet or dry sediment/soil of vernal	The use of the phrase "Site-specific criteria do exist for the IRP Site 1 pond" was not intended to imply that literature values exist for Riverside fairy shrimp toxicity. The Navy has developed site-specific (Site 1 pond) screening values based on existing toxicity data from the literature. The Navy has extensively reviewed scientific literature related to the life history of Anostracans. We agree that immature fairy shrimp may spend some of their time at the sediment-water interface, but we have not identified or reviewed specific literature that suggests that this represents a significant exposure pathway to the Riverside fairy shrimp. However, this possible exposure pathway was one of the many characteristics of the species taken into consideration when selecting a suitable surrogate organism for which substantial toxicity data does exist. Daphnids are very similar to fairy shrimp in their anatomy, physiology, life history, and behavior (see separate descriptions of both groups of organisms in Pennak 1989). They produce resting eggs (ephippia) very similar to those of fairy shrimp that are also dessication-resistant and can persist for long durations in dried sediment (Pennak 1989). Both groups of organisms are filter-feeders that typically feed within the water column. However, as stated by ASTM (2003) daphnids *"are frequently observed on the sediment surface and are likely exposed to both water-soluble and particulate-bound contaminants (through ingestion) in overlying water and surface sediments...These routes of exposure do not, however, mimic those of infaunal benthic invertebrates, which are exposed directly to sediment and interstitial water."* The Navy maintains that, because daphnids are a suitable surrogate group of organisms, daphnid toxicity data are very appropriate when evaluatiing risks for the Riverside Fairy shrimp (see response to Comment Number 3 below). The Navy is not aware of data specific to the Riverside fairy shrimp for potential exposures to embryos contained within cysts. The weight of evidence suggests that resting eggs (fairy shrimp and daphnid) can withstand extreme environmental stresses and, therefore, are potentially resistant to chemicals in the sediment during this inactive life stage.

Document Title:

Navy's Response to Review Comments of August 2004, to the Draft Final Sampling and Analysis Plan Amendment No. 1, Phase II Remedial Investigation, IRP Site 1, Former Marine Corps Air Station, El Toro, California. March 2004.

Reviewer: Andrew Yuen, Deputy Field Supervisor, U.S. Fish and Wildlife Service, Memo dated August 31, 2004

Comment No.	Section/ Page No.	Comment	Response
		pools as well as the water column.	These exposures will be evaluated and addressed as uncertainties in the ecological risk assessment.
2.	Comment Number 6, Page 10 of 15	Should the toxicity testing protocol be implemented, the Service would like to coordinate with the Navy on the testing protocol and the locations for the sample sites from the EOD pond.	Comment noted. If the results of the sediment screening indicate a need for toxicity testing, then the methodology will be proposed in a subsequent Sampling and Analysis Plan Addendum and all parties will have the opportunity to provide input.
3.	Table 1	a). We have reviewed the proposed Sediment Quality Criteria (SQCs) to protect the Riverside fairy shrimp proposed by the Navy. The SQCs were calculated based on the Equlibrium Partioning (EqP) method. While we are not opposed to the method, there are uncertainties associated with the EqP method used to establish the sediment screening criteria for the EOD pond. Results for SQCs may vary depending on the values selected for the parameters (e.g., aquatic toxicity value, log K_{ow}, and log K_{oc} etc.) used to conduct the calculations. The most conservative values were not selected for all parameters to calculate the SQCs. b). Uncertainty also exists when cross-species extrapolations are made in calculations. Some uncertainty could be reduced by the use of an uncertainty factor when deriving sediment benchmarks to account for species differences in toxicity response. An uncertainty factor was not used to account for species differences to calculate the SQCs. c). We recommend that the most conservative values be selected for the calculations in the screening ecological risk assessment as uncertainty and risk to the ecological receptors would be reduced. Based on inherent uncertainties in calculations and the absence of toxicity empirical data for the Riverside fairy shrimp, the Service recommends the Navy consider using the lower benchmark numbers for explosives presented in	a). The Navy acknowledges that there are uncertainties associated with the EqP method as well as the parameters used to conduct the calculations. The uncertainties will be addressed in the ecological risk assessment. By using the EqP method for deriving risk-based sediment screening values for the Site 1 Pond, the Navy has incorporated the site- and chemical-specific information needed to adequately assess risks to the Riverside fairy shrimp. Intentionally selecting the most conservative parameter values used in the calculations (specifically the log K_{ow}, and log K_{oc}) would be contrary to this site- and chemical-specificity and would lead to overly conservative and unrealistic risk estimations. b). Use of an uncertainty factor as suggested is not relative to the toxicity values or benchmarks used in the SQC calculations for this site. All uncertainties will be addressed in the ecological risk assessment. c). The Navy maintains that, because daphnids are a suitable surrogate group of organisms, daphnid toxicity data are more appropriate (for discerning risks to the Riverside Fairy shrimp) than the most conservative benchmarks as suggested by the reviewers. Part of that decision-making process involved a discussion with Dr. Sylvia Talmage (lead author of Talmage et al. 1999) concerning the applicability of using their "Secondary Chronic Values" (SCVs) for explosives. As noted in the attached phone log, Dr. Talmage agreed that using daphnid chronic values may be more applicable than the SCVs used in Talmage et al. (1999) for a site like the El Toro Site 1 Pond when a fairy shrimp species is the ecological receptor of concern. Her response was that the 1999 paper was written because there were no other generic guidelines to go by at that time and therefore it is better to develop site-specific screening values based on the ecological

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Reviewer: Andrew Yuen, Deputy Field Supervisor, U.S. Fish and Wildlife Service, Memo dated August 31, 2004

Comment No.	Section/ Page No.	Comment	Response
		Talmage et al. (1999) or selecting the lower water quality criteria numbers for making the benchmark calculations. Selecting the lowest water quality criteria numbers for the munitions calculations will be consistent with the Navy's selection of the lowest water quality criteria number for the SQCs calculations used for all other contaminants of concern. For example, the lower Great Water Quality Initiative rather than the higher Daphnid Chronic Values were used to calculate the SQCs for other contaminants of concern.	receptor of concern than to rely on generic guidance. The Navy agrees to consistently use the most conservative toxicity value or *benchmark* (including the Talmage SCVs for explosives) as recommended by the reviewers in deriving SQCs for the screening ecological risk assessment. In the event that further analyses are necessary beyond the initial screening, the Navy will use more applicable screening values that are derived from the already-available daphnid chronic toxicity values in order to ensure the most appropriate level of protection for the Riverside fairy shrimp.
4.	Table 6-1	Under reduced conditions in sediment/water systems, TNT is transformed via biotic and abiotic pathweays to by products that include 4-amino-2,6-dinitrotoluene and 2,4-diamino-6-nitrotoluene (Environment Agency 2000). Although explosives are persistent in surface soils and resist biodegradation, biodegradation does occur. Mono-dinitrotoluenes (2-amino-4,6-dinitrotoluene and 4-amino-2,6-dinitrotoluene) and diamino-nitrotoluenes (2,4-diamino-6-nitrotoluene and 2,6-diamino-4-nitrotoluene) are the most common intermediates of TNO (Craig et al. 1995). EPA Method 8330 for explosives includes the analysis of these compounds. The mono-dinitrotoluenes are included in Table 6-1. The diamino-nitrotoluenes (2,4-diamino-6-nitrotoluene and 2,4-diamino-4-nitrotoluene) should be added to the analyte list in Table 6-1.	It is assumed that the compounds in question are 2,4-diamino-6-nitrotoluene and 2,6-diamino-4-nitrotoluene (the last line mentions 2,**4**-diamino-4-nitrotoluene, assumed to be a typographical error). These two compounds have been identified as by-products of aerobic and anaerobic decomposition of TNT, but are **not** listed in USEPA Method 8330 as target analytes (http://www.epa.gov/epaoswer/hazwaste/test/pdfs/8330.pdf) Revision 0, Sept 1994. The compounds do have similar functional groups and would be expected to be detectable by this method. The Navy will add these new target analytes; however, in the absence of method development data, the reporting limits are estimated to be above the toxicity thresholds. This may limit the usefulness of the data in evaluating impacts to the Riverside fairy shrimp within the pond area.

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Navy's Response to Review Comments of August 2004, to the Draft Final Sampling and Analysis Plan Amendment No. 1, Phase II Remedial Investigation, IRP Site 1, Former Marine Corps Air Station, El Toro, California. March 2004.

Reviewer: Andrew Yuen, Deputy Field Supervisor, U.S. Fish and Wildlife Service, Memo dated August 31, 2004

References Provided by USFWS

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Appendix B
USFWS Biological Opinion for Sampling of the Site 1 EOD Pond

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Carlsbad Fish and Wildlife Office
6010 Hidden Valley Road
Carlsbad, California 92009

In Reply Refer To:
FWS-OR-1682.5

DEC 3 2004

Dean Gould
Department of the Navy
Base Realignment and Closure
Program Management Office West
1230 Columbia Street, Suite 1100
San Diego, California 92101

Re: Biological and Conference Opinion for Sampling of Installation Restoration Program (IRP) Site 1 Ephemeral Pond on Former Marine Corps Air Station El Toro, Orange County, California.

Dear Mr. Gould:

This document transmits our biological and conference opinion based on our review of the proposed contaminants sampling of the IRP Site 1 ephemeral pond on the former Marine Corps Air Station El Toro (MCAS El Toro), Orange County, California, and its effects on the federally endangered Riverside fairy shrimp (*Streptocephalus woottoni*) and proposed critical habitat in accordance with section 7 of the Endangered Species Act of 1973 (Act), as amended (16 U.S.C. 1531 *et seq.*). Based on the information contained in your letter received on November 9, 2004, letter, we initiated formal consultation on that date (see Consultation History below).

This biological opinion is based on information provided in the *Amendment One to Work Plan, Phase II Remedial Investigation IRP Site 1, Explosive Ordnance Disposal Range, Former Marine Corps Air Station, El Toro, California*, dated March 2004, site visits, and correspondence, notes and information compiled during the course of our informal consultation with the Department of the Navy (Navy) and coordination under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This information and other references cited in this biological opinion constitute the best available scientific information on the status and biology of the species considered. The complete administrative record for this consultation is on file at this office.

Consultation History

On September 27, 2000, we received a *Draft Work Plan, Phase II Remedial Investigation, IRP Site 1, Explosive Ordnance Disposal Range, Marine Corps Air Station, El Toro, California.* On March 26, 2001, we received a letter requesting concurrence that proposed remedial

investigations on Site 1 would not affect the Riverside fairy shrimp or the coastal California gnatcatcher (*Polioptila californica californica*, "gnatcatcher"). At that time, sampling within the Site 1 pond was not proposed. On May 3, 2001, we sent a letter concurring with the conclusion that the proposed actions would not affect the Riverside fairy shrimp or gnatcatcher but suggested that because of the long history of detonating unexploded ordnance on the site, direct testing of the soils in the Site 1 pond might be advisable as part of the remedial investigations.

On June 6, 2002, we received the *Final Work Plan, Ordnance and Explosives Range Evaluation, IRP Site 1, Explosive Ordnance Disposal Range, Marine Corps Air Station, El Toro, California.* On September 30, 2002, we received the *Final Work Plan, Phase II Remedial Investigation, IRP Site 1, Explosive Ordnance Disposal Range, Marine Corps Air Station, El Toro, California.* On November 7, 2002, we met with the Navy to discuss the need for contaminants testing in the Site 1 pond, and the Navy agreed to conduct the recommended testing.

On November 25, 2002, we received the *Amendment One to Work Plan, Phase II Remedial Investigation IRP Site 1, Explosive Ordnance Disposal Range, Former Marine Corps Air Station, El Toro, California*, which included proposed testing for contaminants in the Site 1 pond. On December 16, 2002, the Service provided written comments regarding the proposed sampling methodology.

On January 15, 2003, we received the *Interim Analytical Data Package, IRP Site 1, Explosive Ordnance Disposal Range, Former Marine Corps Air Station, El Toro, California*, and on February 27, 2003, we received the *Draft Screening Ecological Risk Assessment, Phase II Remedial Investigation IRP Site 1, Explosive Ordnance Disposal Range, Marine Corps Air Station, El Toro, California.* On May 12, 2003, we responded to the *Draft Screening Ecological Risk Assessment* and provided recommendations regarding the methodology that would be used to sample the Site 1 pond. On June 10, 2003, the Service met with the Navy to discuss the Draft Screening Ecological Risk Assessment, including the methodology that would be used to sample the Site 1 pond.

On March 17, 2004, we received the Draft Final Sampling and Analysis Plan Amendment No. 1, Phase II Remedial Investigation, IRP Site 1, Former Marine Corps Air Station, El Toro, California, which included a revised methodology for the proposed testing for contaminants in the Site 1 pond. On May 25, 2004, the Service provided written comments regarding the proposed sampling methodology. On July 29, 2004, the Navy provided responses, and on August 31, 2004, the Service provided additional written comments regarding the proposed sampling methodology. On September 17, 2004, the Navy provided responses to our August 31, 2004 comments, at which time the Service had no further comments

On November 9, 2004, we received a letter from the Navy stating that although they did not believe a formal section 7 consultation was required for this project because it is a remedial action under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the Navy was willing to voluntarily follow the consultation requirements of section 7 of the ESA. Although the Service believes that the requirements of section 7 of the ESA apply

to this and other CERCLA-related projects, we also agreed to move forward with the consultation.

BIOLOGICAL AND CONFERENCE OPINION

DESCRIPTION OF THE PROPOSED ACTION

Soil samples will be taken from the Site 1 pond and the immediately surrounding area as described and shown on Figure 4-3 of the *Draft Final Sampling and Analysis Plan Amendment No. 1, Phase II Remedial Investigation, IRP Site 1, Former Marine Corps Air station, El Toro, California* (Navy 2004). The area to be sampled will be divided into a grid containing 16 blocks that are 30 feet by 30 feet. Three of the 16 blocks will have judgmental sampling conducted at the locations of two geophysical anomalies and at the lowest portion of the pond where the highest potential exists for accumulation of potential contamination. At each of the three discrete sampling locations, with the exception of the sample point at the low area of the pond, two samples will be collected. One sample will be collected at the surface, and one will be collected at 5 feet below ground surface (bgs) or just below the depth of the geophysical anomaly if it is determined that the anomaly is shallower than 5 feet bgs. In the sample point at the low area of the pond, an undisturbed core will be extracted from just below the surface sample to 5 feet bgs, which will be retained for geotechnical evaluation, if necessary. Then at 5 feet bgs, a soil sample will be collected using a hand auger, which will be submitted for chemical analysis. In each of the 13 remaining blocks, a single surface sample will be collected from each block. Additionally, for all 16 blocks, composite samples will be collected by dividing each block into four sub-blocks and collecting one sample from each sub-block. Each of the four sub-block samples will be composited such that one surface soil sample per block will be submitted for laboratory analysis.

Surface samples will be collected using a trowel, and subsurface samples will be collected using a hand auger. The hand auger is about three inches in diameter and will penetrate to a depth of up to five feet. With the exception of the core sample location in the low area of the pond, the soil will be returned to the hand auger hole by loosely filling it back in. For the core sample, clean fill will be placed where the core is extracted. If there is considerable difficulty in extracting the core, it may be necessary to dig around the core collection tool in the uppermost one to two feet to facilitate its extraction. For both surface and subsurface samples, approximately 32 ounces of soil will be collected, with the exception of the core samples in the low area of the pond, which will have approximately 230 ounces of soil collected, and a maximum of one square foot of the pond bottom will be disturbed.

The sampling is expected to occur in December of 2004. One or two individuals will conduct the sampling, and no vehicles will be used in the pond bottom. The sampling will be supervised by a qualified biologist to ensure that impacts to the Riverside fairy shrimp are minimized.

This consultation does not address any clean-up activities that may occur if contaminants are found in the Site 1 pond. If contaminants are found, the Navy will coordinate with the Service to

develop a separate strategy for clean-up activities that addresses potential impacts to the Riverside fairy shrimp.

STATUS OF SPECIES

The USFWS listed Riverside fairy shrimp as an endangered species on August 3, 1993 (58 FR 41391) because of habitat loss and degradation due to urban and agricultural development, off-road vehicle use, trampling, and other factors. Critical habitat for Riverside fairy shrimp was designated on May 30, 2001 (66 FR 29384), vacated by court order on October 30, 2002, and re-proposed on April 27, 2004. A recovery plan for Riverside fairy shrimp was completed in September 1998 (USFWS 1998).

Riverside fairy shrimp are found in a limited number of disjunct, isolated locations in cismontane southern California from Ventura, Los Angeles, Orange, Riverside, and San Diego counties in the U.S. to northern Baja California, Mexico, north of Ensenada (USFWS 1998, 2001).

The Riverside fairy shrimp is a small freshwater crustacean in the family Streptocephalidae that is restricted to vernal pool and ephemeral basins which function as vernal pools (i.e., road ruts and ditches within vernal pool habitats). Riverside fairy shrimp are relatively long-lived, requiring several weeks to reach maturity, in contrast to other fairy shrimp (including San Diego fairy shrimp, ***Brachinecta sandiegonensis***) which can reach sexual maturity in less than 2 weeks. Riverside fairy shrimp cysts can survive for several years until conditions are favorable for successful reproduction. Not all cysts are likely to hatch in a season, thus providing a mechanism for survival if the inundation period is too short in a given year.

Because of its relatively long maturation, Riverside fairy shrimp are found in relatively deep (>12 inches), cool water vernal pools that are inundated for at least 2 months. Riverside fairy shrimp are also found in disturbed vernal pool habitats where basins have been compacted or artificially deepened, and, therefore, hold water for longer periods of time. Although basins supporting populations often appear to be artificially created or enhanced, such basins are located within soils that are capable of seasonal ponding, and are often surrounded by naturally occurring pool complexes. These "artificial basins" function in the same manner as naturally occurring vernal pools by filling with late fall, winter and/or spring rains that gradually dry up during the spring and/or summer.

Water within pools supporting Riverside fairy shrimp may be clear, but more commonly it is moderately turbid (Eriksen and Belk 1999). Typically pools supporting Riverside fairy shrimp have low total dissolved solids and alkalinity (means of 77 and 65 parts per million, respectively), corroborated by pH at neutral or just below (7.1-6.4) (Eng et al. 1990, Gonzalez et al. 1996, Eriksen and Belk 1999).

Vernal pools are a specialized form of seasonal wetlands that occur in a geographical area extending from southern Oregon through California into northern Baja California, Mexico. Vernal pools form in regions with Mediterranean climates where shallow depressions fill with

water during fall and winter rains and then evaporate in the spring (Collie and Lathrop 1976; Holland 1976, 1978; Holland and Jain 1977, 1988; Thorne 1984). Downward percolation of water within the pools is prevented by the presence of an impervious subsurface layer, like claypan, hardpan, or volcanic stratum (Holland 1976, 1988). Seasonal inundation makes vernal pools too wet for adjacent upland plant species adapted to drier soil conditions, while rapid drying during late spring makes pool basins unsuitable for typical marsh or aquatic species that require a more permanent source of water.

Vernal pool systems are often characterized by different landscape features including mima mound micro-topography, varied pool basin size and depth, and vernal swales. Due to local topography and geology, the pools are usually clustered into pool complexes (Holland and Jain 1988). Pools within a complex typically are separated by distances on the order of meters and may form dense, interconnected mosaics of small pools or a sparser scattering of larger pools. Pool complexes are often interconnected by a shared watershed generally ensuring that some between-pool water flow continues.

Riverside fairy shrimp is among a number of other indigenous plant and aquatic invertebrate species that have evolved to occupy the extreme environmental conditions found in vernal pool habitats (Stone 1990). Loss of historic vernal pool habitat in San Diego County is estimated at around 95 to 97 percent because of intensive cultivation and urbanization (Bauder and McMillan 1998). Lack of historical data precludes the same depth of analysis for Los Angeles, Riverside, Orange, or San Bernardino counties, but losses are considered nearly 100 percent (58 FR 41384). The vernal pool habitat type has been ranked in the California Department of Fish and Game's Natural Diversity Data Base in priority class G1-S1, which denotes communities that occur in California and over less than 2,000 acres globally. Threats to vernal pools can be divided into three major categories: 1) direct destruction of vernal pools such as construction, vehicle traffic, domestic animal grazing, dumping, and deep plowing; 2) indirect threats which degrade or destroy the vernal pool over time such as altered hydrology (e.g., damming, draining), invasion of alien species, habitat fragmentation, and associated deleterious effects resulting from adjoining urban land uses; and 3) potentially catastrophic long-term threats including the effect of isolation on genetic diversity and locally adapted genotypes, air and water pollution, drastic climatic variations, and changes in nutrient availability (Bauder 1986).

ENVIRONMENTAL BASELINE

Regulations implementing the Act (50 CFR §402.02) define the environmental baseline as the past and present impacts of all Federal, State, or private actions and other human activities in the action area. Also included in the environmental baseline are the anticipated impacts of all proposed Federal projects in the action area that have undergone section 7 consultation and the impacts of State and private actions which are contemporaneous with the consultation in progress.

The action area is defined as all those areas subject to direct and indirect effects of the project. For this project, we define the action area to be the pond and surrounding watershed (an area of

about one acre roughly defined by SR241 on the northeast, the man-made berm on the southwest, and surrounding hills on either side) on Site 1 of the former MCAS El Toro where Riverside fairy shrimp have been observed. The pond lies in the northern corner of the former MCAS El Toro, less than two hundred meters from the northeastern and southwestern boundaries of the former base. The pond was created in 1980 by the construction of a berm to the southwest of the pond, reportedly to prevent sheet flow from flooding Site 1 during precipitation events.

The pond appears to hold water seasonally. In 1998, water ponded to a depth of about 1.5 meters and supported a population of Riverside fairy shrimp (Wilcox 1998). Focused surveys for Riverside fairy shrimp have not been conducted since 1998. Casual observers of the pond have not observed ponding water at a depth or duration sufficient to support Riverside fairy shrimp since 1998. However, since Riverside fairy shrimp cysts remain viable for many years, viable cysts likely still occur on the pond bottom.

Past activities in the vicinity of the pond have been restricted primarily to the portion of Site 1 southwest of the berm. These activities included the detonation of unexploded ordnance and munitions, which took place from the 1950's to base closure in 1999. If debris from these activities entered the pond, it could be a source of potential contamination.

Remedial investigations on Site 1 from 2001 to present have involved taking soil samples from throughout the site and installing monitoring wells. These activities have been conducted in the watershed of the Site 1 pond but because these activities have disturbed only a small amount of soil, they are not likely to have resulted in any negative indirect effects to the fairy shrimp pond.

Critical Habitat

The proposed project is in Unit 2 of proposed critical habitat. This unit contains Riverside fairy shrimp populations and habitat in coastal Los Angeles County and the foothills of Orange County. Critical habitat in Unit 2 was designated because there are only a few remaining sites in the unit where Riverside fairy shrimp have been observed (including the IRP Site 1 ephemeral pond), and, therefore, the protection of these sites is important for the long-term survival and recovery of the species.

EFFECTS OF THE ACTION

Effects of the action refer to the direct and indirect effects of an action on the species, together with the effects of other activities that are interrelated and interdependent with that action, that will be added to the environmental baseline. Interrelated actions are those that are part of a larger action and depend on the proposed action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration. Indirect effects are those that are caused by the proposed action and are later in time but are still reasonably certain to occur.

Direct Effects

The soil samples in each 900 square foot grid will disturb an estimated 4 square feet potentially containing Riverside fairy shrimp cysts. Thus, the project will impact approximately 0.5% percent of the soil potentially containing Riverside fairy shrimp cysts. If not carefully controlled, the increased human activity associated with the sample collection could result in further disturbance of the pond bottom and potential impacts to cysts. However, only one or two people will be used to collect the samples, and the sample collection will be monitored by a qualified biologist to ensure that no activities are performed that could result in additional impacts to Riverside fairy shrimp.

Indirect Effects

Potential indirect effects from the proposed project include the degradation of habitat as a result of piercing the clay layer that allows the pond to hold water or increasing sedimentation within the pond. However, the IRP Site 1 ephemeral pond does not appear to have a well-defined clay layer. Thus, accumulation of standing water in the pond is likely more dependent on saturation of the soil on the pond bottom rather than maintenance of an intact clay layer. The cores of sediment that will be taken from a depth of five feet are only three inches in diameter, and any hole that is created due to the taking of a sample will be refilled with native soil or clean fill to help maintain the ability of the pond to hold water. Because of the small scale of soil disturbance and other minimization measures, the proposed project is not expected to result in any increased sedimentation within the pond above current levels.

Critical Habitat

Effects of the proposed project on critical habitat include potential effects to the ability of the IRP Site 1 ephemeral pond to support a Riverside fairy shrimp population. As discussed above, the proposed project will affect an estimated 0.5% of the soil potentially containing Riverside fairy shrimp cysts and, with the proposed minimization measures, is not anticipated to increase sedimentation or affect the pond's ability to hold water.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, Tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

There are no non-federal actions anticipated in the action area.

CONCLUSION

After reviewing the current status of the Riverside fairy shrimp, the environmental baseline for the action area, the direct and indirect effects of the proposed project, and the cumulative effects, it is our biological and conference opinion that the proposed action to sample for contaminants in the Site 1 pond is not likely to jeopardize the continued existence of the Riverside fairy shrimp or result in adverse modification of proposed critical habitat.

We reached these conclusions by considering the following:

1) The proposed project will impact only an estimated 0.5% of the Riverside fairy shrimp cysts likely to be in the Site 1 pond.

2) The proposed project is designed to benefit the Riverside fairy shrimp in the long-term by identifying any potential contaminants that may threaten the persistence of the Riverside fairy shrimp in that pond.

3) The proposed project is not likely to affect the ability of the pond to hold water and support a population of Riverside fairy shrimp.

4) The measures proposed by the Navy will minimize impacts to Riverside fairy shrimp cysts and the habitat.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act, and Federal regulations issued pursuant to section 4(d) of the Act, prohibit take of endangered and threatened species without a special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that actually kills or injures a listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as an action that creates the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), such incidental taking is not considered to be a prohibited taking under the Act provided that such taking is in compliance with this Incidental Take Statement.

The measures described below are non-discretionary and must be implemented by the Navy in order for the exemption in section 7(o)(2) to apply. The Navy has a continuing duty to regulate the activity that is covered by this incidental take statement. If the Navy (1) fails to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to

the permit or grant document, and/or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

AMOUNT OR EXTENT OF TAKE

The proposed action may result in the mortality of Riverside fairy shrimp cysts on four square feet (0.5% of the soil) in the Site 1 pond. The precise number of cysts that may be lost is unquantifiable.

EFFECT OF THE TAKE

In the accompanying biological and conference opinion, we determined that this level of anticipated take is not likely to result in jeopardy to the Riverside fairy shrimp or adverse modification of proposed critical habitat.

REASONABLE AND PRUDENT MEASURES

We have not identified any additional reasonable and prudent measures beyond the minimization measures, committed to by the Navy and described in the project description of this biological opinion, that are necessary or appropriate to further minimize the incidental take of Riverside fairy shrimp during project implementation.

TERMS AND CONDITIONS

To be exempt from the prohibitions of section 9 of the Act, the Navy must comply with terms and conditions which implement the reasonable and prudent measure described above. Since no further reasonable and prudent measures are identified, no terms and conditions are necessary.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The recommendations provided here relate only to the proposed action and do not necessarily represent complete fulfillment of the agency's responsibility for this species, pursuant to section 7(a)(1) of the Act.

We recommend that, in coordination with CFWO, the Navy should develop and implement a plan to repair the breach in the dam for the Site 1 pond. The breach may be inhibiting the ability of the pond to hold water for long periods of time.

REINITIATION NOTICE

This concludes formal consultation on the proposed action. As provided in 50 CFR § 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is reached; (2) new information reveals effects of the agency action that may adversely affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is reached, any operations causing such take must cease pending reinitiation. Any questions or comments should be directed to Jonathan Snyder of my staff or me at (760) 431-9440.

Sincerely,

for Karen A. Goebel
Assistant Field Supervisor

cc:
CDFG, Sacramento, California (Attn: Regina Donohoe)
California DTSC, Sacramento, California (Attn: Kathy San Miguel)
City of Irvine, Irvine, California (Attn: Daniel Jung)
DoN, Base Realignment and Closure, San Diego, California (Attn: Shannon Bryant)
RWQCB, Santa Ana Region, Riverside, California (Attn: John Broderick)
U.S. EPA, Region IX, San Francisco, California (Attn: Sonce DeVries)
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