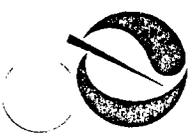


AR



Department of Toxic Substances Control



Linda S. Adams
Secretary for
Environmental Protection

Maureen F. Gorsen, Director
5796 Corporate Avenue
Cypress, California 90630



Arnold Schwarzenegger
Governor

M60050_003712
MCAS EL TORO
SSIC NO. 5090.3.A

August 14, 2006

Mr. Darren Newton
BRAC Environmental Coordinator
Base Realignment and Closure
Marine Corps Air Station El Toro
7040 Trabuco Road
Irvine, California 92618

COMMENTS ON DRAFT FINAL PHASE II REMEDIAL INVESTIGATION REPORT INSTALLATION RESTORATION PROGRAM SITE 1, EXPLOSIVE ORDNANCE DISPOSAL RANGE, FORMER MARINE CORPS AIR STATION EL TORO, CALIFORNIA

Dear Mr. Newton:

The Department of Toxic Substances Control (DTSC) received for its review the Draft Final Phase II Remedial Investigation Report Installation Restoration Program Site 1, Explosive Ordnance Disposal Range, Former Marine Corps Air Station (MCAS) El Toro, California dated June 2006.

This report presents the results of Phase II remedial investigation conducted at the site.

Based on our review of the document, DTSC has the following comment:

Summary and conclusions, page 9-2, item number 3, last sentence states:
"Concentrations of naphthalene exceeded the Cal-Modified EPA Region 9 residential and industrial PRGs of 1.7 and 4.2 mg/kg respectively, at seven sampling locations." Please remove the words "Region 9" from this sentence and correct the industrial PRGs value (4.47 mg/kg). Also, please reconcile Figure 4-2 with the same information for naphthalene and throughout the whole document.

Attached, please find the DTSC Human and Ecological Risk Division and the California Department of Fish and Game review and comments on this document.

received
8/21/06

Mr. Darren Newton
August 14, 2006
Page 2 of 3

Thank you for giving DTSC the opportunity to review this document. We look forward to continuing to work with you on base cleanup activities at the MCAS El Toro. If you have any questions, please call me at (714) 484-5381.

Sincerely,



Sue Hakim
Remedial Project Manager
Base Closure and Reuse Unit
Office of Military Facilities

Attachments

cc: Ms. Content Arnold
Remedial Project Manager
Base Realignment and Closure
Program Management Office West
1455 Frazee Road, Suite 900
San Diego, California 92108-4310

Mr. Arturo Tamayo
Remedial Project Manager
Base Realignment and Closure
Program Management Office West
1455 Frazee Road, Suite 900
San Diego, California 92108-4310

Mr. Richard Muza
Remedial Project Manager
U. S. Environmental Protection Agency Region IX
Superfund Division (SFD-8-1)
75 Hawthorne Street
San Francisco, California 94105-3901

Mr. John Broderick
Remedial Project Manager
California Regional Water Quality Control Board
Santa Ana Region
3737 Main Street, Suite 500
Riverside, California 92501-3348

PAGE 3 OF 3

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FOR ADDITIONAL INFORMATION, CONTACT:

DIANE C. SILVA, RECORDS MANAGER
NAVAL FACILITIES ENGINEERING COMMAND, SOUTHWEST
1220 PACIFIC HIGHWAY
SAN DIEGO, CA 92132

TELEPHONE: (619) 556-1280
E-MAIL: diane.silva@navy.mil



Linda S. Adams
Secretary for
Environmental Protection



Department of Toxic Substances Control

Maureen F. Gorsen, Director
1011 North Grandview Avenue
Glendale, California 91201



Arnold Schwarzenegger
Governor

MEMORANDUM

TO: Soad Hakim
Office of Military Facilities
Department of Toxic Substances Control
5796 Corporate Avenue
Cypress, California 90630

FROM: Riz A. Sarmiento, Ph.D. 
Staff Toxicologist
Human and Ecological Risk Division

DATE: August 10, 2006

SUBJECT: Draft Final - Phase II Remedial Investigation (RI) Report, Installation Restoration Program Site 1, Explosive Ordnance Disposal Range, Former Marine Corps Air Station, El Toro

PCA: 18040 Site: 400055-18

BACKGROUND

Document Reviewed: Per your request, the Human and Ecological Risk Division (HERD) reviewed the above-referenced report. The document was prepared by Earth Tech, Inc., dated June 2006.

Scope of Review: This document was reviewed to determine whether HERD's comments on the draft human health risk assessment were addressed and incorporated adequately into this draft final report.

Background: Site 1 is approximately 73 acres in size and includes the Northern Explosive Ordnance Disposal (EOD) Training Range and the Southern EOD Training Range and surrounding areas. The chemicals of potential concern are Munitions of Concern (MC), explosives, perchlorate, fuel hydrocarbons, volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and dioxins/furans. The media of potential concern are soil, groundwater, sediment, and surface water.

On July 21, 2005, HERD recommended the use of surrogate compounds to evaluate detected chemicals without available preliminary remediation goals (PRGs). This included using (a) the PRG for dinitrotoluene mixture to evaluate 2-amino, 4,6-dinitrotoluene, 4-amino, 2,6-dinitrotoluene; (b) the PRG for hexane to evaluate 2-hexanone, (c) the noncarcinogenic PRG of

naphthalene to evaluate 2-methylnaphthalene, (d) the PRG of pyrene to evaluate benzo(g,h,i)perylene, (e) the PRG of acenaphthene to evaluate acenaphthylene, and (f) the PRG of anthracene to evaluate phenanthrene,

A conference call was held on December 20, 2005 to discuss the responses to comments from DTSC and EPA. The Navy was reluctant to use the recommended surrogate compounds because of the lack of adequate toxicological information that the surrogate compounds will manifest the same effects as the chemicals in question. The Navy agreed to submit additional information on the prevalence and distribution of these chemicals for review by DTSC and EPA.

The Navy agreed to present the risk estimates using Cal/EPA toxicity factors along with the risk estimates using the EPA toxicity factors. The Navy also indicated that the indoor air pathway will be evaluated through the use of the DTSC-modified Johnson and Ettinger model.

Other comments from HERD were not discussed and no indication was given whether these will be addressed in the revised submittal.

GENERAL COMMENTS

HERD does not recommend using soil data to evaluate the vapor intrusion pathway because of greater uncertainties associated with predicting the indoor air concentrations based on chemical concentrations in soil. Therefore, HERD recommends that results of the indoor air evaluation based on groundwater data, rather than soil data, be used as one of the factors in the risk management decision.

SPECIFIC COMMENT

1. Figure 4-2.

It appears that the Figure identifies the naphthalene concentrations that exceeded the CalEPA-modified PRGs instead of the EPA Region 9 PRGs. HERD recommends that the accuracy of the Figure be reviewed and corrected, if necessary.

DISCUSSION AND CONCLUSIONS

This Draft Final report addressed and incorporated the comments provided by HERD on the Draft RI Report for Site 1. As requested by HERD, the risk estimates based on using CalEPA-modified toxicity factors were presented along with the risk estimates based on using the USEPA toxicity factors.

If the CalEPA-modified toxicity factors are applied, the cumulative risk estimates due to potential soil exposures of a resident are consistently at 1E-04 due to naphthalene, which is considered a carcinogen by CalEPA. Naphthalene was detected only once in the surface soil, but was detected at a frequency of 4% in the subsurface soil. Considering that naphthalene was detected in a limited area in Trench 34, HERD recommends that the Navy considers the removal of the soils where naphthalene concentrations exceeded the CalEPA-modified PRGs.

The USEPA has not classified naphthalene as a carcinogen. Hence, the cumulative risk due to surface soil exposures of a resident, based on using EPA toxicity factors, is $8E-06$. Overall, the risk estimates due to potential soil exposures of a resident range from $8E-06$ to $1E-05$ due to arsenic and RDX.

The risk estimate due to vapor intrusion of TCE from groundwater is $7E-07$ when the CalEPA-modified toxicity factors are applied. However, the risk due to potential indoor air exposures to TCE from the groundwater is estimated to be $3E-05$ when the USEPA toxicity factors are applied. The difference in the results of the indoor air evaluation is attributed to TCE being considered more carcinogenic by USEPA. In general, the most current information should be used in risk assessments. However, the U.S. EPA slope factor is provisional since comments have been made by interested parties including the Air Force. Since the California O.E.H.H.A. has not revised its cancer slope factors, it is appropriate to retain the earlier cancer slope factors. This opinion is likely to change when U.S. EPA reaches a final decision about these provisional cancer slope factors.

The Navy states that TCE was only detected in one round of sampling but TCE was detected at a frequency of 16%. Although $3E-05$ (based on EPA toxicity factor) is within the risk management range of $1E-06$ to $1E-04$, HERD recommends that the Navy provide a more robust justification that no further evaluation or monitoring is required.

We hope that the comments we have provided are constructive and useful. If you have any questions or concerns, please contact me at (818) 551-2983.

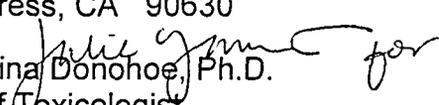

Reviewed by: Michael J. Wade, Ph.D., D.A.B.T.
Senior Toxicologist, HERD
Human and Ecological Risk Division

Memorandum

Sue Hakim
Remedial Project Manager
Department of Toxic Substances Control
Office of Military Facilities
5796 Corporate Avenue
Cypress, CA 90630

Date: August 1, 2006

From:


Regina Donohoe, Ph.D.
Staff Toxicologist
California Department of Fish and Game
Office of Spill Prevention and Response
20 Lower Ragsdale Dr., Suite 100
Monterey, CA 93940

Subject:

Draft Final Phase II Remedial Investigation Report for Installation Restoration Program Site 1 – Explosive Ordnance Disposal Range, Former Marine Corps Air Station, El Toro, California (SITE: 400055)

Introduction

The Department of Fish and Game-Office of Spill Prevention and Response (DFG-OSPR) received the "Draft Final Phase II Remedial Investigation (RI) Report for Installation Restoration Program (IRP) Site 1 – Explosive Ordnance Disposal Range, Former Marine Corps Air Station (MCAS), El Toro, California (June 2006)" on July 5, 2006.

Background

IRP Site 1 covers approximately 73 acres, and is located in the northeast portion of the former MCAS, El Toro in Orange County, California. The site, located within a tributary canyon of Borrego Canyon Wash, was used as an explosive ordnance disposal area from 1952 to 1999. A variety of military ordnance and explosives were detonated in trenches. Habitat at the site consists of grassland, coastal scrub (9.7 acres), chaparral (2.6 acres), and a bermed retention pond that provides seasonal wetland habitat (0.29 acres). A number of special status species have been observed at Site 1, including the Riverside fairy shrimp and the Coastal California Gnatcatcher.

DFG-OSPR provided comments on the Draft Phase II RI in an August 11, 2005 memorandum to Frank Cheng, Department of Toxic Substances Control (DTSC). The Navy provided responses to these comments (RTC) in December 2005 and DFG-OSPR commented on these responses in a January 23, 2006 memorandum to Frank Cheng, DTSC. Appendix I of the subject report contains the Navy's final RTC on the Draft RI report. DFG-OSPR reviewed Appendix I, and associated text in Appendix H and Section 7.0, to determine if our previous concerns had been addressed. Comments refer to sections in Appendix H but comments also apply to the equivalent subsections in Section 7.0, a more abbreviated version of the ecological risk assessment (ERA). As proposed in our January 23, 2006 memorandum, alternate hazard quotients (HQs) were

calculated by DFG-OSPR to provide a range of risk estimates for those chemicals for which there was disagreement between the Navy and DFG-OSPR on the selection of toxicity reference values (TRVs). In the alternate HQ calculations, DFG-OSPR did not allometrically adjust the TRVs. For comparison purposes, HQs provided by the Navy in the ERA, which were calculated using allometrically adjusted TRVs, are provided.

Comments

1. *Appendix H, Section 2.1.5.5, Chemical Specific Exposure Factors and Attachment H-4.* DFG-OSPR has reviewed the octanol-water partition coefficients (K_{ow}) that were added in Attachment H-4. Organic-carbon distribution coefficients (K_{oc}) were not provided for calculation of invertebrate bioaccumulation factors (BAFs) and some K_{ow} values for explosives were modeled when empirical data are available (Talmadge et al., 1999). Nevertheless, estimated plant and soil invertebrate BAFs for explosives in Attachment H-4 were compared to a recent compilation of empirically derived BAFs (Tsao and Sample, 2005; Best et al, 2006). The selected values appear to provide a reasonable estimate of bioaccumulation in plants and some soil invertebrates. Estimated BAFs for 1,3,5-trinitrohexahydro-1,3,5-triazine (RDX) and octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX) in soil invertebrates are about an order of magnitude lower than empirical BAFs reported in the literature. DFG-OSPR is not recommending changes to the Draft Final RI/FS, but would like to point out this uncertainty in the estimated bioaccumulation rates, as noted in Appendix H, Section 2.2.3.
2. *Appendix H, Section 2.1.7, Toxicity Evaluation.* Perchlorate toxicity benchmarks for plants and soil invertebrates were not addressed in the Draft Final RI but the RTCs (Appendix I) indicated that the values recommended by U.S. EPA (2002; 1 to 4 mg perchlorate/kg wet weight soil) would be utilized. A recent study on the toxicity of perchlorate to earthworms concluded that 1.3 mg perchlorate/kg soil was the effective concentration for reducing cocoon production in 50% of the test animals (EC_{50}) exposed for 21 days (Landrum et al., 2006), supporting the U.S. EPA (2002) toxicity benchmarks. Surface soil analytical data (Attachment H-3) show that the maximum detected perchlorate concentration (1.6 mg/kg) is within the range of concern but the 95% upper confidence limit (UCL; 0.087 mg/kg) is below the level of concern.
3. *Appendix H, Attachment H-5, Benzene.* The Navy continues to assert that adverse immunological and hematological effects associated with benzene exposure are not ecologically relevant. DFG-OSPR continues to disagree. However, alternate benzene HQs for mammals, calculated using DFG-OSPR's recommended TRV (7 mg/kg/d), do not change the overall risk conclusion for this chemical (see table below). DFG-OSPR concurs that, using the current site characterization data, ecological risks associated with benzene ingestion are not significant, but should be considered in the cumulative risk associated with this class of compounds (see Comment 11).

Benzene TRV	Ornate Shrew Tier 1 HQ	Deer Mouse Tier 1 HQ	Weasel Tier 1 HQ
DFG-OSPR: 7 mg/kg/d	0.21	0.53	0.001
Navy: 26 mg/kg/d*	0.05	0.10	0.0004

* Navy HQ values are from Attachment H-7.

4. *Appendix H, Attachment H-5, 2,4-Dinitrotoluene (DNT)*. The Navy DNT no-observed-adverse-effect level (NOAEL; 3.9 mg/kg/d) is based on chronic effects on body weight in rats. DFG-OSPR recommended a chronic NOAEL of 0.2 mg/kg (ATSDR, 1998), based on hematological, hepatic and neurological effects in dogs. In 2006, the U.S. Army Center for Health Promotion and Preventive Medicine released a wildlife toxicity assessment for 2,4 and 2,6-DNT (USACHPPM, 2006). USACHPPM selected the same dog study for TRV development, based on neuromuscular effects, and modeling was done to develop benchmark doses. The LED₁₀ (95% lower confidence limit on the effective dose in 10% of the animals, ED₁₀) was 0.67 mg/kg/d and the ED₁₀ was 1.4 mg/kg/d. Therefore, DFG-OSPR continues to assert that the selected TRV (3.9 mg/kg/d) is not protective for mammals. When Tier 1 HQs were calculated for the alternative TRVs, results indicated potential risk for the ornate shrew and deer mouse (see table below). Due to a low frequency of detection (4%), DNT did not proceed to the Tier 2 evaluation (see Comment 11).

2,4-DNT TRV	Ornate Shrew Tier 1 HQ	Deer Mouse Tier 1 HQ	Weasel Tier 1 HQ
DFG-OSPR: 0.2 mg/kg/d	11.15	246.0	0.47
USACHPPM: 0.67 mg/kg/d	3.32	73.4	0.14
Navy: 3.9 mg/kg/d*	0.40	10.0	0.02

* Navy HQ values are from Attachment H-7

5. *Appendix H, Attachment H 5-1, 2,4-DNT*. NOAEL (0.01 mg/kg/d) and low-observed-adverse-effect level (LOAEL; 1.3 mg/kg/d) based TRVs for DNT were recently developed for birds (USACHPPM, 2006). These new TRVs indicate that mammalian derived TRVs may not be protective of avian receptors. HQs were calculated using the USACHPPM (2006) TRVs and the exposure estimates in Attachment H-7. Results indicated potential risk to the Mourning Dove and

Meadowlark (see table below). Due to a low frequency of detection, DNT did not proceed to the Tier 2 evaluation (see Comment 11).

2,4-DNT TRV	Mourning Dove Tier 1 HQ	Meadowlark Tier 1 HQ	Shrike Tier 1 HQ
USACHPPM NOAEL: 0.01 mg/kg/d	4130	170	0.042
USACHPPM LOAEL: 1.3 mg/kg/d	31.7	1.3	0.0003
Navy: 0.39 mg/kg/d*	100	4.0	0.001

* Navy HQ values are from Attachment H-7

6. *Appendix H, Attachment H-5, HMX.* DFG-OSPR recommended that the mammalian TRV (1 mg/kg/d), selected by USACHPPM (2001), be utilized for HMX. The Navy selected a mouse study that reported a mortality endpoint (3 mg/kg/d). The Navy TRV is relatively close to what DFG-OSPR recommended, and the Tier 1 risk conclusions are not significantly different (see table below). Due to a low frequency of detection (1%), HMX did not proceed to the Tier 2 evaluation (see Comment 11).

HMX TRV	Ornate Shrew Tier 1 HQ	Deer Mouse Tier 1 HQ	Weasel Tier 1 HQ
DFG-OSPR: 1 mg/kg/d	0.02	49	0.09
Navy: 3 mg/kg/d*	0.007	10	0.02

* Navy HQ values are from Attachment H-7

7. *Appendix H, Attachment H-5, Inorganics.* The Navy was unwilling to provide alternate HQs for arsenic, cadmium, cobalt, and lead that utilized the BTAG-recommended mammalian, low TRVs (U.S. Navy, 1998). DFG-OSPR has provided these Tiers 1 and 2 HQs to represent a range of ecological risk estimates (see table below). Risk conclusions are comparable between the two sets of TRVs with cadmium and lead presenting potential risks.

TRV * (mg/kg/d)	Ornate Shrew HQs Tier 1 / Tier 2	Deer Mouse HQs Tier 1 / Tier 2	Weasel HQs Tier 1 / Tier 2
As BTAG: 0.32 Navy: 1.04	1.8 0.6	0.51 0.20	0.51 0.2
Cd BTAG: 0.06 Navy: 0.77	2483 / 81 200 / 6	47 / 10 4 / 5	35 / 0.04 3 / 0.003
Co BTAG: 1.2 Navy: 7.33	0.26 0.04	0.04 0.007	0.07 0.01
Pb BTAG: 1.0 Navy: 4.7	114 / 3 20 / 0.7	13 / 3 3 / 0.7	21 / 0.02 5 / 0.005

* Navy HQ values are from Attachment H-7

8. *Appendix H, Section 2.2.3.2 and Attachment H 5-1, Perchlorate.* DFG-OSPR appreciates that a range of risk estimates were presented for perchlorate to reflect the uncertainties associated with the ecological significance of perchlorate effects on birds and mammals. These estimates indicate that the 95% UCL perchlorate concentration in soil (87 µg/kg) results in exceeding daily doses predicted to have adverse effects on thyroid function and NOAELs for survival, growth and reproduction. Daily doses do not exceed the LOAEL for these latter effects, indicating there is uncertainty as to whether survival, growth and reproduction may be affected by perchlorate. In looking at the distribution of perchlorate concentrations in soil, it seems likely that the risks estimates are driven by the hot-spot at LE182, 01-T34 (1600 µg/kg). Risk managers should consider this hot-spot as a potential source of perchlorate exposure (see Comment 11).
9. *Appendix H, Attachment H-5, 2,4,6-Trinitrotoluene (TNT).* DFG-OSPR continues to recommend that the avian TRV (0.07 mg/kg/d), selected by the USACHPPM (Johnson and McAtee, 2000), be utilized for TNT. When Tier 1 hazard quotients were calculated for the alternative TRV, results indicated potential risk to the three bird receptors (see table below). Due to a low frequency of detection (1%), TNT did not proceed to the Tier 2 evaluation (see Comment 11).

TNT TRV (mg/kg/d)	Mourning Dove Tier 1 HQ	Meadowlark Tier 1 HQ	Shrike Tier 1 HQ
USACHPPM: 0.07	80	8	1
Navy: 0.7*	8	0.8	0.1

* Navy HQ values are from Attachment H-7

10. *Appendix H, Attachment H-5, Inorganics.* The Navy was unwilling to provide alternate HQs for cadmium and lead that utilized the BTAG-recommended, avian, low TRVs (U.S. Navy, 1998). DFG-OSPR has provided these Tier 1 and Tier 2 HQs to represent a range of ecological risk estimates. The results indicate potential risk to birds from cadmium and lead.

TRV * (mg/kg/d)	Mourning Dove HQs Tier 1 / Tier 2	Meadowlark HQs Tier 1 / Tier 2	Shrike HQs Tier 1 / Tier 2
Cd			
BTAG: 0.08	63 / 4	1312 / 56	19 / 0.52
Navy: 1.47	3 / 0.2	71 / 3	1 / 0.03
Pb			
BTAG: 0.014	2700 / 88	8714 / 274	1078 / 29
Navy: 1.63	21 / 0.8	71 / 2	9 / 0.2

* Navy HQ values are from Attachment H-7

11. *Appendix H, Sections 2.2.4.3 and 3.6.3.1.* DFG-OSPR requested that additional text be added to the Draft Final Phase II RI to explain the "hot-spot" analysis for infrequently detected contaminants. Sections and figures have been added to spatially describe the distribution of contaminants of potential ecological concern (COPECs). However, the ERA concludes that these hot-spots do not present a significant risk to the ecological receptors at the site. We have concerns regarding the interpretation of risks associated with these hot spots.

- a. *Petroleum-related compounds.* In Section 2.2.4.3, it is acknowledged that Tier 1 exceedances are driven by a few sample locations near the former disposal trenches. Maximum soil concentrations for petroleum-related compounds generally occur at the sampling location 01-T34 at a depth of 2 feet (see table below). At this location, concentrations of benzene, ethylbenzene, toluene, xylenes (BTEX), naphthalene, and 2-methylnaphthlene exceed soil-screening levels for the protection of plants and soil invertebrates. Total petroleum hydrocarbon (TPH; petroleum hydrocarbons-diesel) concentrations in soil are equivalent to levels that have been reported to have adverse effects on plants and soil invertebrates (e.g., Efyomson et al, 2004). We believe that these TPH concentrations and detection frequencies (18%) should be considered by risk managers because indicator compounds, such as BTEX, do not always accurately predict the ecotoxicity

of petroleum mixtures (Suter, 1997). Tier 1 HQs for birds and mammals also indicate potential risks associated with this hot-spot, especially when cumulative risks for these classes of compounds are considered. DFG-OSPR is concerned that the petroleum contamination may impact less mobile receptors, such as plants and soil invertebrates, as shown by the HQ exceedances below. Additionally, it may be a source for groundwater contamination or future exposure of wildlife if site conditions change.

COPEC	% Detect.	Max. Soil Conc. (mg/kg)	Sample Location	Plant/ Invertebrate HQ	Bird/Mammal Tier 1 HQ (Table 2-8)
Benzene	2	0.610	01-SS-T29a-S02-D3.0	1	<1
Ethylbenzene	2	14	01-SS-T34-S01-D2.0	12	3
Toluene	14	41	01-SS-T34-S01-D2.0	51	5
Xylenes	2	9.8	01-SS-T34-S01-D2.0	98	1000
Naphthalene	2	128	01-SS-T34-S01-D2.0	6	10
2-Methyl Naphthalene	2	270	01-SS-T34-S01-D2.0	14*	10
PHC-Diesel	18	37,000	01-SS-T34-S01-D2.0	Not evaluated	Not evaluated

*Naphthalene used as a surrogate

- b. *Metals*. Metal Tier 1 HQ exceedances are at sampling locations 01-T-28 and 01-T33 at a depth of 3 feet, adjacent to the areas of petroleum contamination (see table below). The Tier 1 HQs for plants, soil invertebrates, birds and mammals are considerable in magnitude and warrant concern, especially considering uncertainties with the TRVs, as discussed in Comments 7 and 10. For the Tier 2 HQs for birds and mammals, several metals presented a significant risk to birds and mammals (e.g., cadmium, copper, lead, and zinc) based on the NOAEL TRVs (Appendix H, Section 3.4). Using LOAEL based TRVs, copper HQs still exceeded 1. Refined risk estimates (i.e., Tier 2) are not provided for plants and soil invertebrates, but 95% UCL soil concentrations exceed screening criteria for copper and zinc. DFG-OSPR is concerned that these metal-contaminated hot-spots present risk to less mobile receptors, and may be a source of future exposure of wildlife if site conditions change.

COPEC	Max. Soil Conc. (mg/kg)	Sample Location	Plant/ Invertebrate HQ	Bird/Mammal Tier 1 HQ (Table 2-8)
Cadmium	156	01-SS-T34-S01-D2.0	5	200
Chromium	171	01-SS-T28-S01-D3.0	428	8
Copper	16,700	01-SS-T33-S01-D3.0	335	1000
Lead	1,580	01-SS-T33-S01-D3.0	14	70
Zinc	29,100	01-SS-T28-S01-D3.0	582	100

- c. *Explosives*. Tier 1 HQs indicated potential risk associated with perchlorate and explosive compounds, especially considering the uncertainties with the TRVs identified in Comments 2, 4, 5, 6, 8 and 9 (see table below). In the Tier 2 ERA, many organic COPECs, including explosive compounds, were eliminated due to being detected in less than five percent of the samples (see table below). DFG-OSPR does not agree with eliminating these compounds based on frequency of detection. While explosive compounds have not been found to be elevated site-wide, they are present as hot-spots, particularly at sample locations BH01 and T34. DFG-OSPR is concerned that these explosive-contaminated hot-spots present risk to less mobile receptors, and may be a source of future exposure of wildlife if site conditions change. Additionally, perchlorate contamination in soil may continue to contribute to the observed groundwater contamination.

COPEC	% Detect	Max. Soil Conc. (mg/kg)	Sample Location	Plant/ Invertebrate HQ	Bird/Mammal Tier 1 HQ (Table 2-8)
Perchlorate	7	1.6	01-SS-T34-S02-D6.0	0.4 - 1.6	100
TNT	1	7.86	01-SS-BH01-S01-D5.0	0.3	10
RDX	3	14	01-SS-BH01-S01-D5.0	0.3	10
HMX	1	1.4	01-SS-BH01-S01-D5.0	0.09	2

Conclusion

DFG-OSPR continues to disagree on the selection of several TRVs, and has provided alternate HQs in this memorandum. We request that these comments be included in Appendix I to record DFG-OSPR's concerns regarding the selected TRVs and overall risk conclusions. The ERA concludes that no further evaluation is necessary to protect the ecological receptors at Site 1. We do not believe the Draft Final RI has adequately evaluated risks associated with the hot-spot areas. Due to the significant levels of soil contamination in the hot-spot areas (see Comment 11), DFG-OSPR recommends additional evaluation of the disposal trench areas. In lieu of making further changes to the Draft Final RI, these concerns may be addressed in the feasibility study for Site 1. Remediation of these areas would reduce current potential risk and future risks should conditions change at the site. We believe risk managers should consider the feasibility of this option. If you have any questions or require further details, please contact Regina Donohoe by phone (831-649-7150) or email (rdonohoe@ospr.dfg.ca.gov).

Reviewed by: Beckye Stanton, Ph.D., Associate Toxicologist

cc: Sonce de Vries
U.S. Environmental Protection Agency, Region 9
75 Hawthorne St.
San Francisco, CA 94105

Judy Ann Gibson
U.S. Fish and Wildlife Service
6010 Hidden Valley Road
Carlsbad, CA 92009

Riz Sarmiento
Department of Toxic Substances Control
1011 North Grandview Ave.
Glendale, CA 91201

References:

- Agency for Toxic Substances and Disease Registry (ATSDR). 1998. Toxicological Profile for 2,4- and 2,6-Dinitrotoluene. U.S. Department of Health and Human Services, Atlanta, Georgia
- Best, E.P.H., Geter, K.N., Tatem, H.E., and Lane, B.K. 2006. Effects, transfer, and fate of RDX from aged soil in plants and worms. *Chemosphere* 62: 616-625.
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