Pacific Gas and Electric Company

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18 August 2009

Mr. Aaron Yue
Chief Permitting Unit
California Department of Toxic Substances Control
5796 Corporate Avenue
Cypress, California 90630

Ms. Pamela S. Innis
Office of Environmental Policy and Compliance
U.S. Department of Interior
P.O. Box 25007 (D-108)
Denver, CO 80225-0007

Subject: ***Topock Compressor Station – Final Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil***

Dear Mr. Yue and Ms. Innis:

This letter transmits the *Final Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil* (ECV TM4) prepared as part of the RCRA Facility Investigation/Remedial Investigation (RFI/RI) process to support the soil investigation and site characterization at the Pacific Gas and Electric Company (PG&E) Topock Compressor Station.

The Final Technical Memorandum 4 was prepared incorporating all comments received to date from the California Department of Toxic Substances Control (DTSC) and the U.S. Department of Interior (DOI) and was submitted to DTSC and DOI on July 1, 2009. Two versions of the final technical memorandum were submitted:

1. The final technical memorandum showing changes to the text in red-line-strike-out mode.
2. Cover letter and the "clean" version of the final technical memorandum (with all changes incorporated).

No additional changes have been made to the Final Technical Memorandum 4 since it was submitted to DTSC and DOI on July 1, 2009.

PG&E received concurrence on the Final Technical Memorandum 4 from DTSC and DOI on August 3, 2009.

We appreciate your attention to this document and look forward to your participation in the data gaps assessment.

If you have any questions regarding this letter, please call me at (805) 234-2257.

Sincerely,

Yvonne Meeks
Topock Project Manager

Enclosures: Topock Compressor Station – Final Technical Memorandum: Ecological Comparison Values for Additional Detected Chemicals in Soil.

cc: Michael Eichelberger, DTSC
Carrie Marr, USFWS
Shukla Roy-Semmen, DTSC
Karen Baker, DTSC
Dennis Smith, SAIC
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1 July 2009

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Subject: ***Topock Compressor Station – Final Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil***

Dear Mr. Yue and Ms. Innis:

Enclosed is the *Final Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil* (ECV TM4) prepared as part of the RCRA Facility Investigation/Remedial Investigation (RFI/RI) process to support the soil investigation and site characterization at the Pacific Gas and Electric (PG&E) Topock Compressor Station (the site). Thank you for your effort in resolving the remaining technical comments on the technical memorandum.

ECV TM4 is based on methods provided in a previously-approved technical memorandum (ECV TM3) that provided soil ecological comparison values (ECVs) for certain metals and polycyclic aromatic hydrocarbons (PAHs). ECV TM4 provides ECVs for other chemicals (for example, dioxins/furans, polychlorinated biphenyls) that were detected during the Part A Phase 1 soil investigation at the site.

ECV TM4 was first submitted to the Department of Toxic Substances (DTSC) and the U.S. Department of Interior (DOI) on January 15, 2009. PG&E received written comments (January 30, 2009) and oral comments (February 26, 2009) on the technical memorandum. PG&E submitted responses to those comments to DTSC and DOI on March 17, 2009. PG&E received further written comments on PG&E's responses from DTSC/Human and Ecological Risk Division (HERD) on March 30, 2009. DOI had no further comments on the March 17, 2009 response to comments (communicated at the RCRA/CERCLA meeting on April 1, 2009). Based on the written comments from DTSC/HERD (March 30, 2009), PG&E submitted closing responses and the revised technical memorandum incorporating all comments (in red-line-strike-out) on April 27, 2009. DTSC and DOI accepted most of the changes to the revised ECV TM4 but requested additional clarification and information on a technical call on June 1, 2009. A summary of the discussion from June 1, 2009 along with the requested information was provided by ARCADIS to the agencies by email on June 3, 2009. Additional information was requested by DOI on June 9, 2009, which was provided to the agencies via email on June 10, 2009 and discussed on another technical call on June 11, 2009. We received concurrence on all outstanding comments on the ECV TM4 from DTSC and DOI via emails dated June 24 and 25, 2009. PG&E has prepared the final technical memorandum incorporating all comments and direction received since the last submittal of the revised ECV TM4 (April 27, 2009). As requested by DOI, changes to the final memorandum text are in red-line-strike-out. The complete final ECV TM4 (text, tables, and Attachment 1) is also provided.

The primary objective of developing ECVs is to assist in evaluating the adequacy of the site characterization. The ECVs are to be applied only to soil investigation planning in conjunction with background values and comparison values for the protection of human health. The ECVs are not intended for use as either cleanup goals or as screening levels to eliminate constituents of potential ecological concern (COPECs).

Please review this final technical memorandum and provide concurrence or direction by July 10, 2009. The ECVs are needed for the forthcoming soil data gaps assessment for each AOC. Therefore, your timely concurrence with the ECVs is an integral part of the soil investigation planning process. We appreciate your attention to this document and look forward to your participation in the data gaps assessment.

If you have any questions regarding this letter, please call me at (805) 234-2257.

Sincerely,

Yvonne Meeks
Topock Project Manager

Enclosures: Topock Compressor Station – Final Technical Memorandum: Ecological Comparison Values for Additional Detected Chemicals in Soil.

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MEMO

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Copies:
Dave Gilbert
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Keith Sheets
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From:
ARCADIS Risk Team

Date:
July 1, 2009

ARCADIS Project No.:
RC000689.0006.00005

Subject:
Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil

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The purpose of this revised technical memorandum is to provide the methods used to develop soil ecological comparison values (ECVs) for the additional chemicals detected during the Part A Phase 1 soil investigation at the Pacific Gas and Electric (PG&E) Topock Compressor Station, located in San Bernardino County, California, 12 miles southeast of Needles (the site). ECVs were previously provided for metals and polycyclic aromatic hydrocarbons (PAHs); ECVs for these chemicals were developed and presented in the Technical Memorandum 3 (ECV TM3; ARCADIS, 2008). The additional chemicals detected during the Part A Phase 1 soil investigation and the corresponding ECVs are listed in Table 1. U.S. Environmental Protection Agency's (USEPA's) Ecological Soil Screening Levels (EcoSSLs; USEPA 2007), if available for these additional chemicals, are also presented in Table 1 for reference.

The ECVs protective of ecological receptors are to be applied only to soil investigation planning in conjunction with background values and human health based comparison values. The human health based comparison values used are the California Human Health Screening Levels (CHHSLs) or the Regional Screening Levels (RSLs). Therefore, for site-characterization and to guide step-out sampling for each chemical, three comparison values may be used (as available). These comparison values are (1) ECVs, (2) CHHSLs or RSLs, as appropriate, and (3) background values. The ECVs are not intended for use as either cleanup goals or as screening levels to eliminate constituents of potential ecological concern (COPECs). The primary objective of ECVs is to assist in evaluating the adequacy of the site characterization (i.e., help determine the need for step-out sampling). The ECVs, background concentrations, and comparison values for the protection of human health will be used to evaluate the data collected for the Part A Phase 1 soil investigation and assist in identifying data gaps that may require Part A Phase 2 soil sampling. The ECVs developed in ECV TM3 and in this technical memorandum can be used to help define the extent of the site-related constituents in soil and assess the need for additional site characterization. Furthermore, the ECVs can also be used to optimize the selection of sampling locations to limit disturbing the existing habitat.

ECVs are risk-based values protective of ecological receptors and were developed based on direct exposures and food-chain exposures. PG&E attempted to develop ECVs for all chemicals detected at least once onsite; factors such as octanol-water partitioning coefficients (log Kow) were not used as selection criteria to include or exclude chemicals from ECV development.

The ECVs for the additional detected chemicals are listed in Table 1 and also provided below. Additional chemicals detected during the Part A Phase 1 soil investigation and historical investigations were inorganic compounds (aluminum, calcium, cyanide, iron, magnesium, potassium, and sodium), polychlorinated biphenyls (PCBs; Aroclor 1254 and Aroclor 1260), dioxins/furans, pesticides (4,4-dichlorodiphenyldichloroethylene [4,4'-DDE], 4,4- dichlorodiphenyltrichloroethane [4,4'-DDT], alpha-chlordane, gamma-chlordane, and dieldrin), volatile organic compounds (VOCs; methyl acetate), and semivolatile organic compounds (SVOCs; 4-methylphenol, bis(2-ethylhexyl)phthalate, di-n-butylphthalate, carbazole, pentachlorophenol, dibenzofuran, butyl benzyl phthalate, and 2,4-dimethylphenol).

The approach and methodology, including input parameters and equations used to develop ECVs for the additional chemicals, are the same as those described in ECV TM3 (ARCADIS, 2008), approved by the Department of Toxic Substances Control (DTSC) on November 6, 2008 (technical meeting) and by e-mail on December 17, 2008 and approved by U.S. Department of Interior (USDOI) by e-mail on December 5, 2008, and are not repeated herein. The toxicity values (i.e., screening values for plants and soil invertebrates and toxicity reference values [TRVs] for wildlife) and the bioaccumulation factors (BAFs) and uptake models used in the derivation of ECVs for the additional chemicals are summarized in Attachment 1. Examples of the derivation of the wildlife-based ECVs for gamma-chlordane and cyanide are also provided in Attachment 1.

Selection of Soil Ecological Comparison Values

The selected ECVs for the additional chemicals are presented in Table 1. ECVs for the additional chemicals were based on the protection of plants, soil invertebrates, and wildlife receptors. The soil ECVs for plants and invertebrates were based on the screening values for these receptors (Table 1). ECVs were developed for each wildlife receptor following the approach and methodologies described in ECV TM3. Consistent with ECV TM3, ECVs for the additional chemicals were selected based on the most conservative no-observed adverse effects level (NOAEL)-based TRVs (Attachment 1). For the sake of brevity, ECVs based on the lowest-observed adverse effects (LOAEL)-based TRVs were not calculated in this technical memorandum.

Consistent with the approved ECV TM3, the most conservative of all the ecological receptor-based soil ECVs was selected as the final ECV unless confidence in the screening value or TRV used to calculate ECV was low. In such cases, the next most conservative ECV was selected as the final ECV. This is the case for alpha- and gamma-chlordanes and dieldrin (Table 1). Confidence in the soil invertebrate ECVs for these pesticides is low due to the low number of studies on which the screening values are based or other factors (use of uncertainty and adjustment factors, see Attachment 1). The soil type and test species used also vary from site-specific conditions, and the toxic effects were unspecified in the source study. Confidence in the wildlife ECVs for these pesticides, which were based on TRVs from USEPA's EcoSSL guidance (USEPA, 2007), was greater and wildlife ECVs were selected as the final ECVs.

PG&E attempted to develop ECVs to account for direct and food-chain exposures from all the detected chemicals onsite. However, for some detected chemicals, ECVs could not be developed due to limited toxicity data. In other cases, ECVs were not developed because the chemical was detected at a very low frequency of detection and at very low concentrations relative to the reporting limit resulting in insignificant potential exposures (see Table 2 for a summary of soil results for these compounds). In agreement with the agencies on a call on February 26, 2009 and in the letter dated March 30, 2009 from DTSC responding to PG&E's response to comments on ECV TM4, development ECVs for these chemicals was not warranted at this time. This is further explained below.

ECV development is not warranted for dibenzofuran, butyl benzyl phthalate, and 2,4-dimethylphenol at this time because these chemicals were detected once each and in separate historical samples from 1997 at Area of Concern 4 (AOC4). A total of 643 solid matrix (soil, sediment, debris, wood, and white powder) samples were analyzed for each of these chemicals. These three chemicals were detected at trace concentrations (below standard reporting limits). See Table 2 for a summary of the sampling results. Based on the low concentrations and low frequency of detects, exposures to dibenzofuran, butyl benzyl phthalate, and 2,4-dimethylphenol at the site are not expected to be significant. Therefore, with agency agreement, ECVs were not developed for these three chemicals at this time. In the event that new soil data are collected and these compounds are detected, the need for these ECVs will be reevaluated.

Similarly, methyl acetate was detected in only three solid matrix samples out of 67 collected to date. See Table 2 for a summary of the sampling results. These concentrations of methyl acetate are considered low (slightly above the reporting limits) and are not expected to result in significant accumulation in burrow air, the primary ecological pathway of concern. In addition, these three results are isolated detections from samples located in three different AOCs. They do not provide a consolidated or consistent opportunity for potential exposure in burrow air. Therefore, based on low frequency of detects, low detected concentrations, and divergent locations, potential ecological exposure is expected to be insignificant in burrow air, and, with agency concurrence, ECVs were not developed for methyl acetate.

Although toxicity data are available for essential nutrients (e.g., for iron), the likelihood of iron and other inorganic constituents (calcium, magnesium, potassium, and sodium) being risk drivers at the site is remote. Therefore, based on agency agreement, ECVs were not developed for iron, calcium, magnesium, potassium, and sodium.

PG&E attempted to develop ECVs for 4-methylphenol (p-cresol) based on direct exposure and food-chain exposures. Screening values were available for plants and invertebrates and ECVs for plants and soil invertebrates were based on these screening values. However, there is limited wildlife TRVs available for this chemical and a wildlife ECV could not be developed. Additionally, 4-methylphenol was detected at low concentrations (slightly above the reporting limits) in only 2 separate samples out of a total of 641 solid matrix samples collected to date. In addition, these two results are from isolated detections from samples located in two different AOCs. Based on the low concentrations, low frequency of detects, and lack of appropriate toxicity values, wildlife ECVs could not developed for 4-methylphenol. See Table 2 for a summary of the sampling results. The selected ECV for 4-methylphenol was based on the lowest of the plant and soil invertebrate ECVs.

As requested by the agencies (email from Aaron Yue/DTSC on May 13, 2009), data for the chemicals with low frequency of detects (dibenzofuran, butyl benzyl phthalate, 2,4-dimethylphenol, methyl acetate, and 4-methylphenol) in solid matrices are provided in Attachment 1.

Tables

1. Ecological Comparison Values Summary for Additional Chemicals Detected in Soil
2. Solid Matrix Detections for 2,4-Dimethylphenol, 4-Methylphenol, Butyl Benzyl Phthalate, Dibenzofuran, Methyl Acetate

Attachment

1. Input Parameters Used in Developing Ecological Comparison Values for Additional Chemicals Detected in Soil

References

ARCADIS. 2008. *Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil*. May

USEPA. 2007. Guidance for Developing Ecological Soil Screening Levels (Eco-SSLs). OSWER Directive 9285.7-55. United States Environmental Protection Agency Office of Solid Waste and Emergency Response. Washington, DC. November 2993, revised March 2005. http://www.epa.gov/ecotoc/ecossl/

Tables

Table 1
Ecological Comparison Values Summary for Additional Chemicals Detected in Soil

Technical Memorandum 4
PG&E Topock
Needles, California

Chemical	Proposed Ecological Comparison Values (mg/kg)					Other Available Wildlife Soil Screening Values (mg/kg)[c]		
	Plant ECV	Soil Invertebrate ECV	Wildlife ECV[a]	Selected ECV[b]	ECV Basis[b]	EcoSSLs/ESLs	Source	Based On
Metals/Inorganic Constituents								
Aluminum[d]	pH<5.5	pH<5.5	pH<5.5	pH<5.5	All	NA	--	--
Calcium	no literature screening values available	no literature screening values available	NA	NA	NA	NA	--	--
Cyanide	NA	0.90	2.35	0.90	Soil Invertebrates	NA	--	--
Iron	no literature screening values available	no literature screening values available	NA	NA	NA	NA	--	--
Magnesium	no literature screening values available	no literature screening values available	NA	NA	NA	NA	--	--
Potassium	no literature screening values available	no literature screening values available	NA	NA	NA	NA	--	--
Sodium	no literature screening values available	no literature screening values available	NA	NA	NA	NA	--	--
Polychlorinated Biphenyls (PCBs)								
Total PCBs	40.0	1.00	0.204	0.204	Cactus Wren	--	--	--
Pesticides								
DDT and Metabolites	0.900	0.010	0.0021	0.0021	Red-Tailed Hawk	0.0210	USEPA, 2007	mammals
Alpha-Chlordane	0.224	0.00430	0.470	0.470	Cactus Wren	--	--	--
Dieldrin	1.00	0.050	0.0050	0.0050	Desert Shrew	0.0049	USEPA, 2007	mammals
Gamma-Chlordane	0.22	0.00430	0.470	0.470	Cactus Wren	--	--	--
Volatile Organic Compounds (VOCs)								
Methyl Acetate	no literature screening values available	no literature screening values available	[e]	[e]	[e]	--	--	--
Semi-Volatile Organic Compounds (SVOCs)								
2,4-Dimethylphenol	[e]	[e]	[e]	[e]	[e]	--	--	--
4-Methylphenol (p-Cresol)	10.0	0.500	[f]	0.500	Soil Invertebrates	--	--	--
Bis(2-ethylhexyl)phthalate	200	200	2.87	2.87	Cactus Wren	--	--	--
Butyl benzyl phthalate	[e]	[e]	[e]	[e]	[e]	--	--	--
Carbazole	no literature screening values available	2800	--	2800	Soil Invertebrates	--	--	--
Dibenzofuran	[e]	[e]	[e]	[e]	[e]	--	--	--
Di-n-butylphthalate	200	200	0.0469	0.0469	Cactus Wren	--	--	--
Pentachlorophenol	5.00	31.0	2.49	2.49	Cactus Wren	2.1	USEPA, 2007	birds
Dioxin/Furan								
Dioxin TEQ	--	--	1.6E-06	1.6E-06	Desert Shrew	--	--	--

Notes:
Please see Attachment 1 for complete sources of inputs to ECV calculations.
Example calculations for ecological comparison values for gamma-chlordane and cyanide are provided in Figures A-1 and A-2, respectively, in Attachment 1.

-- not available.
EcoSSL = Ecological Soil Screening Levels
ECV = Ecological Comparison Values
ESL = Environmental Screening Values
mg/kg = milligrams per kilogram
NA = not applicable
TEQ = toxic equivalent

a. Based on the lowest calculated ECV for wildlife.
b. Final ECV selected based on lowest ECV unless ECV was based on toxicity value of low confidence (e.g., alpha and gamma chlordanes).
c. Limited sources are available for widlife screening values; the lowest available value selected.
d. Potential ecological risks associated with aluminum are identified based on the measured soil pH. Aluminum is identified as a COPC only at sites where the soil pH is less than 5.5.
e. Due low concentrations and low frequency of detects, exposures to this chemical at the site are not expected to be significant. Therefore, with agency agreement, ECVs were not developed for this chemical at this time.
f. Due low concentrations and low frequency of detects, exposures to this chemical at the site are not expected to be significant. Therefore, wildlife ECVs were not developed for this chemical at this time.

USEPA, 2007. *Guidance for Developing Ecological Soil Screening Levels* (Eco-SSLs). OSWER Directive 9285.7-55. United States Environmental Protection Agency Office of Solid Waste and Emergency Response. Washington, DC. November 2003, revised March, 2005. http://www.epa.gov/ecotox/ecossl/

Table 2
Solid Matrix Detections for 2,4-Dimethylphenol, 4-Methylphenol, Butyl Benzyl Phthalate, Dibenzofuran, and Methyl Acetate

Technical Memorandum 4
PG&E Topock
Needles, California

Detected Chemical	Units	SampleDate	Matrix	Sample ID	RFI Area	Top Depth (ft bgs)	Bottom Depth (ft bgs)	Result	Site-wide FOD[a]
2,4-Dimethylphenol	µg/kg	04/24/97	Soil	DR-6-D	AOC4	0.5	1	44	1/643
4-Methylphenol	µg/kg	10/23/08	Soil	300B-1-10003	300B	2.5	3	460	2/641
4-Methylphenol	µg/kg	09/30/08	Soil	AOC14-2-8006	AOC14	0	0.5	430	
Butyl benzyl phthalate	µg/kg	04/24/97	Soil	DR-4-S	AOC4	0	0.5	60	1/643
Dibenzofuran	µg/kg	04/24/97	Soil	DR-6-S	AOC4	0	0.5	53	1/643
Methyl acetate	µg/kg	10/17/08	Soil	AOC1-T3a-048	AOC1	2	3	6.6	3/67
Methyl acetate	µg/kg	09/24/08	Soil	6051	AOC11	2	3	17	
Methyl acetate	µg/kg	10/14/08	Soil	AOC4-1-3003	AOC4	2	3	12	

Notes:
ft bgs = feet below ground surface
FOD = frequency of detects
RCRA = Resource Conservation and Recovery Act
RFI = RCRA Facility Investigation
µg/kg = micrograms per kilogram

a. Other solid matrices included in the FOD are: debris (AOC14-13-8089), sediment (AOC1-BCW6-122 and AOC1-BCW6-123), white powder (AOC4-D30-11051, AOC9-14-4032, AOC14-2-8088, SWMU1-WP10-2069, SWMU1-WP-6h-2040, SWMU1-WP7-2047, and SWMU1-WP-5h-2028), and wood (AOC4-Wood1-3070R and AOC4-Wood2-3071R). See Table A-2 for matrix-specific results.

Attachment 1

Input Parameters Used in Developing Soil Ecological Comparison Values for Additional Chemicals Detected in Soil
Pacific Gas and Electric (PG&E)
Topock Compressor Station, Needles, California

Introduction

Soil ecological comparison values (ECVs) were calculated for the additional chemicals detected during Part A Phase 1 soil investigation. ECVs were based on conservative toxicity values (i.e., values below which no unacceptable risk is expected) protective of representative ecological receptors potentially present at the Pacific Gas and Electric (PG&E) Topock Compressor Station, Needles, California (the site). The ecological receptors include plants, soil invertebrates, and wildlife (birds and mammals). Representative ecological receptors include the following:

- Plants
- Invertebrates
- Birds
  - Gambel's Quail (granivore)
  - Cactus Wren (insectivore)
  - Red-Tailed Hawk (carnivore)
- Mammals
  - Desert Shrew (insectivore)
  - Merriam's Kangaroo Rat (granivore)
  - Desert Kit Fox (carnivore).

For plants and soil invertebrates, the target toxicity values were based on the lowest screening values. For wildlife, the target toxicity values were based on the lowest available no-observed adverse effects levels (NOAELs). For wildlife, ECVs were developed following the same ECV equation used in Technical Memorandum 3 (ECV TM3; ARCADIS, 2008a) (i.e., re-arrangement of the hazard quotient [HQ] equation to solve for a target HQ of 1). The input parameters for the ECV equation include body weight, soil and food ingestion rates, site use factors (SUFs), bioaccumulation factors (BAFs), and toxicity reference values (TRVs). Parameters such as body weight, soil and food ingestion rates, and SUFs are the same as those specified in the *Human Health and Ecological Risk Assessment Work Plan* (RAWP; ARCADIS, 2008b) and in ECV TM3 (ARCADIS, 2008a) and are not repeated herein. The sources for chemical-specific parameters such as screening values, TRVs, and BAFs are summarized in this attachment. The derivation of ECVs for gamma-chlordane and cyanide are provided as examples in Figures A-1 and A-2, respectively.

Screening values protective of plants and soil invertebrates and TRVs protective of wildlife were selected or developed from the literature sources listed below. Where available, screening values, TRVs, and BAFs were selected based on sources recommended in ecological risk assessment guidance documents (CalEPA, 1996, USEPA, 1999); sources were referenced for these parameters and study details are not provided in this attachment. Parameters for chemicals that were not readily available were developed based on literature reviewed are described in this attachment.

Plant and Soil Invertebrate Screening Levels

Plant and soil invertebrate screening levels were selected from the following sources in order of preference and presented in Table A-1:

- U.S. Environmental Protection Agency (USEPA)'s *Guidance for Developing Ecological Soil Screening Levels (Eco-SSLs)* (USEPA, 2007a)
- Oak Ridge National Laboratory (ORNL): *Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants: 1997 Revision* (Efroymson et al., 1997a) and *Toxicological Benchmarks for Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process: 1997 Revision* (Efroymson et al., 1997b)
- Lowest of chemical-specific, non-background values from:
  - USEPA's Region 5 Ecological Screening Levels (USEPA, 2003)
  - USEPA's *Supplemental Guidance to Risk Assessment Guidance for Superfund (RAGS): Region 4 Bulletins* (USEPA, 2001)
  - U.S. Fish and Wildlife Service *Evaluating Soil Contamination* (Beyer, 1990)
- Canadian Council of Ministers of the Environment *Soil Quality Guidelines* (CCME, 2006)
- Dutch "Maximum Permissible Concentrations" (MPCs) or derived values from toxicity data supporting the MPCs (i.e., Van de Plassche, 1994)
- Empirical data from USEPA's ECOTOX Database (USEPA, 2007b)
- Toxicity values based on surrogate chemicals.

Screening levels for plants and soil invertebrates were not available for calcium, iron, magnesium, sodium, and potassium, because these metals are considered essential nutrients (USEPA, 1989) and are generally not considered in risk evaluations. Plant screening levels were not available for cyanide and carbazole. Screening levels for the following chemicals were not readily available and, therefore, were developed as discussed below.

Plants

- For 4,4-dichlorodiphenyltrichloroethane (4,4'-DDT), toxicity data were available in the ECOTOX database (USEPA, 2007b). A study by Urzua et al. (1986) was selected for developing a plant screening level. In this study, Dutch clover was grown for 10 to 14 weeks in soil amended with 4,4'-DDT. Statistically significant reductions in plant biomass and mycorrhizal colonization were first observed at 9 milligrams per kilogram (mg/kg). Although effects on root mycorrhizal colonization were observed at soil concentrations of 1 mg/kg, these effects were beneficial to the clover. Therefore, the concentration of 9 mg/kg was assumed as a lowest-observed adverse effects concentration (LOAEC) and an uncertainty factor (UF) of 10 was applied to extrapolate to a chronic no-observed adverse effects concentration (NOAEC), resulting in a value of 0.9 mg/kg, which was used as the plant screening level for total DDT and all its metabolites (including 4,4- dichlorodiphenyldichloroethylene [4,4'-DDE]), as reported in Table A-1.

- For chlordane, a screening level of 0.224 (mg/kg) is recommended by USEPA's Region 5 guidance (USEPA, 2003) based on unreported toxicological effects. Additional empirical data for chlordane suggesting much higher screening levels were also available. However, the most conservative level of 0.224 mg/kg was selected as the plant screening level for alpha-chlordane and gamma-chlordane, as reported in Table A-1.

- For dieldrin, toxicity data were available in the ECOTOX database (USEPA, 2007b). A study by Rajanna and De la Cruz (1977) reported ecologically adverse effects at the lowest concentration and was used to develop screening levels for plants. In this study, cotton, soybean, bread wheat, and corn seeds were grown in soil amended with dieldrin for 21 days. The seeds were heat-treated at 40° C for 5 days, 2 days, or not treated. Heat-treated seeds showed reductions in biomass and plant height when grown in the amended soil, while non-treated seeds showed no effect. The LOAEC reported was 10 mg/kg for bread wheat. A UF of 10 was applied to extrapolate to a chronic NOAEC of 1 mg/kg, which was used as the plant screening level for dieldrin, as reported in Table A-1.

- For 4-methylphenol (or p-cresol), toxicity data were available for 2-methylphenol in the ECOTOX database (USEPA, 2007b), which was used as a surrogate for 4-methylphenol. A study by Adema and Henzen (2001) reported NOAECs based on effects on growth and mortality endpoints on *Lactuca sativa* ranging from 10 mg/kg to greater than 100 mg/kg. The screening level for 4-methylphenol was based on the lowest reported NOAEC of 10 mg/kg, as reported in Table A-1.

Soil Invertebrates

- For 4,4'-DDT, USEPA Region 4 (2001) recommends a soil screening level of 0.0025 mg/kg. This level is based on the Netherlands Ministry of Housing, Planning, and Environment (MHSPE) Target level, or typical ambient concentration (MHSPE, 1994). Background values are not based on toxicological effects to site receptors and, therefore, not preferred as screening levels despite being recommended by USEPA Region 4 (2001). The Canadian soil quality guideline (CCME, 2006) for total DDT (i.e., DDT and metabolites) based on residential soil is 0.7 mg/kg. In a study by Van de Plassche (1994), a DDT median lethal or effects concentration (i.e., LC50 or EC50) for *Collembola* of 10 mg/kg based on a total organic content (TOC) of 10 percent (%) was reported. The lethal or effects concentration was assumed to be an LC50 value, because invertebrate toxicity tests typically measure mortality. Empirical data from ECOTOX database (USEPA, 2007b) were also available for DDT. In a study by Harris (1966), 1st instar cricket larvae were exposed to soils amended with DDT for 18 hours and the mean LC50 of all soils reported was 39.4 mg/kg. However, the study reported by Van de Plassche (1994) was selected as the most appropriate and conservative basis for the DDT screening level. A UF of 100 was applied to extrapolate from an acute lethal concentration of 10 mg/kg to a chronic NOAEC, resulting in a value of 0.1 mg/kg as illustrated in Figure A-3. However, the TOC was assumed to be 1% (consistent with USEPA 2007a) and the soil invertebrate screening level was adjusted accordingly as illustrated in Figure A-4. The resulting soil invertebrate screening level is 0.01 mg/kg for 4,4'-DDT and its metabolites (including 4,4'-DDE) (Table 1, Table A-1).

- For chlordane, USEPA Region 4 (2001) recommends a soil screening level of 0.1 mg/kg; however, this value is based on the "A" value or background concentration for organochlorine pesticides from Beyer (1990). Screening levels based on ambient concentrations were not selected for developing ECVs. In a study by Van de Plassche (1994), a chlordane LC50 or EC50 for insects of 4.3 mg/kg based on a TOC of 10 % was reported. This value was assumed to be an LC50 value, because invertebrate toxicity tests typically measure mortality. Empirical data were also available from the ECOTOX database (USEPA, 2007a). Goats and Edwards (1988) reported a 14-day earthworm LC50 of 23.9 mg/kg. The study reported by Van de Plassche (1994) was selected as the most appropriate basis for the chlordane screening level. A UF of 100 was applied to extrapolate from an acute lethal concentration to a chronic NOAEC, resulting in a value of 0.043 mg/kg as illustrated in Figure A-3. The TOC of 10% was adjusted here using 1% TOC (USEPA, 2007a) resulting in a soil invertebrate screening level of 0.0043 mg/kg for chlordane as illustrated in Figure A-4 and reported in Table A-1. The screening level of 0.0043 mg/kg was reported as the soil invertebrate ECV for alpha- and gamma- chlordanes in Table 1.

- For dieldrin, Van de Plassche (1994) reports a lowest dieldrin NOAEC for *Onychiurus armatus* (of Order Collembola) of 0.5 mg/kg based on a TOC of 10 %. Due to lack of other published screening levels, the study reported by Van de Plassche (1994) was selected as the NOAEC for dieldrin as illustrated in Figure A-3. The TOC of 10% was adjusted here using 1% TOC (USEPA, 2007a) resulting in a soil invertebrate screening level of 0.05 mg/kg for dieldrin as illustrated in Figure A-4 and reported in Table A-1. The screening level of 0.05 mg/kg was reported as the soil invertebrate ECV for dieldrin in Table 1.

- For carbazole, toxicity data were available for in the ECOTOX database (USEPA, 2007b). A study by Svedrup et al. (2006) reported a NOAEC of 2800 mg/kg based on mortality endpoint. Due to limited toxicity data for carbazole, the result from this study was selected as the carbazole screening level for soil invertebrates.

Wildlife Toxicity Reference Values

The most conservative NOAEL-based TRVs for wildlife were selected from the following sources and presented in Table A-1:

- USEPA's EcoSSL Guidance (USEPA, 2007a).

- California Environmental Protection Agency (CalEPA)'s *Currently Recommended U.S. Environmental Protection Agency Region 9 Biological Technical Assistance Group (BTAG) Mammalian and Avian Toxicity Reference Values* (CalEPA, 2002).

- ORNL: *Toxicological Benchmarks for Wildlife:1996 Revision* (Sample et al., 1996).

Wildlife TRVs were not available for calcium, iron, sodium, magnesium, potassium, methyl acetate, 4-methylphenol, and carbazole. Therefore, soil ECVs based on wildlife could not be developed for these chemicals. Inorganic compounds such as calcium, iron, magnesium, potassium, and sodium are considered essential nutrients (USEPA, 1989) and are generally not considered in risk evaluations. Wildlife TRVs for the following chemicals were not readily available and, therefore, were developed as discussed below.

- For cyanide, a mammalian TRV was available from Sample et al. (1996). The Agency for Toxic substances and Disease Registry (ATSDR) Toxicological Profile for cyanide (ATSDR, 2006) contained several studies with more sensitive endpoints than reported in Sample et al. (1996). A 13-week National Toxicology Program study (NTP, 1993) conducted with rats was the most sensitive ecologically relevant study and was selected to develop mammalian TRVs. In this study, rats were exposed to sodium cyanide via drinking water. Decreased spermatogenesis in males was first observed at a dose of 12.5 milligrams per kilogram body weight per day (mg/kg-day), with a NOAEL of 4.5 mg/kg-day. The study is considered by ATSDR to be highly reliable, with adequate replication, number of dose groups, and an exposure of chronic duration. No UFs were applied to these values. Avian TRV of 0.04 mg/kg-day for cyanide was available in USEPA guidance (USEPA, 1999).

Bioaccumulation Factors

BAFs were selected for dietary uptake into plant, invertebrate, and mammal tissue. These values were selected from the following sources in order of preference and presented in Table A-1:

- USEPA's EcoSSL Guidance (USEPA, 2007a).
- USEPA's Screening Level Ecological Risk Assessment Protocol for Hazardous Waste Combustion Facilities (USEPA, 1999).
- Other sources as listed in Table A-1.

BAFs for the following chemicals were not readily available and, therefore, were developed as discussed below.

- For bis(2-ethylhexyl)phthalate and di-n-butyl phthalate, numerous studies show limited potential for bioaccumulation in plants and wildlife. In a review of data for phthalate esters, Staples et al. (1997) demonstrated extremely limited uptake of bis(2-ethylhexyl)phthalate and di-n-butyl phthalate by plants as well as extensive metabolism in higher trophic levels (birds and mammals) (Aranda et al.,1989; Schmitzer et al., 1988; Kato et al., 1981; Lokke and Bro-Ramussen, 1981; Lokke, 1988; Belise et al., 1975; O'Shea and Stafford, 1980; Ishuida et al. 1982 – all as cited in Staples et al., 1997). Therefore, for plants and wildlife, the BAF for bis(2-ethylhexyl)phthalate and di-n-butyl phthalate was assumed to be zero. For invertebrates, the data was not so conclusive based on a review for phthalate esters by Staples et al. (1997): Lokke (1988) reported no accumulation of bis(2-ethylhexyl)phthalate in woodlice or their offspring fed a diet of bis(2-ethylhexyl)phthalate -containing oak leaves in a 6-month microcosm experiment. However, Albro et al. (1993) reported very slow bis(2-ethylhexyl)phthalate breakdown when injected in earthworms. No known bis(2-ethylhexyl)phthalate metabolites were found and hydrolysis was slow. Although no empirical data were available from these studies, and the route of exposure was injection not ingestion, the authors did conclude that bioaccumulation is likely to occur in earthworms. Therefore, for phthalates, an uptake model for non-ionic organic chemicals in soil based on partitioning theory and the K_{ow} of the contaminant (i.e., the Jager model [Jager, 1998]) as recommended by USEPA (2007a) was used to estimate bioaccumulation into invertebrates.

- Cyanide is highly reactive and readily metabolized in organisms demonstrating low bioaccumulation potential (Eisler, 1991). Eisler (1991) also reported that cyanide seldom remains biologically available in soils because it is either complexed by trace metals, metabolized by various microorganisms, or lost through volatilization. Also, wildlife can detoxify sublethal doses of cyanide and excrete it as thiocyanate in urine (Eisler, 1991). Therefore, the BAF for cyanide was assumed to be zero.

- For carbazole, the soil-to-invertebrates BAF of 0.01 recommended by the agencies based on the study by Sverdrup et al., (2006) was used to calculate ECVs for insectivorous wildlife (i.e., the wren and the shrew). The soil-to-mammal BAF for carbazole of was modeled based on prey uptake rather than soil uptake, similar to the method described by Baes et al. (1984) used in the EcoSSL guidance (USEPA, 2007a). As described in USEPA guidance (USEPA, 1999), the Travis and Arms (1988) model was used to calculate the prey-to-animal uptake.

- For chlordane, there are no readily available literature soil-to-mammal BAFs. Because dieldrin is structurally similar to chlordane,the soil-to-mammal BAF for dieldrin (USEPA, 2007a)was used in estimating chlordane uptake from soil to mammal tissue.

Tables

Figures

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Tables

Table A-1
Screening Levels, TRVs, and Tissue Uptake Concentrations

Attachment 1 to Technical Memorandum 4
PG&E Topock
Needles, California

Analyte	Screening Levels (mg/kg)				Proposed Toxicity Reference Values[a] (mg/kg-day)					Tissue Uptake Concentration (mg/kg)					
	Plants	Source	Invertebrates	Source	Avian	Source	Mammalian	Source	Log K_{ow}[i]	Plant	Source	Invertebrate	Source	Mammal	Source
Metals															
Aluminum	pH<5.5	EcoSSL Guidance (USEPA, 2005-2007)	pH<5.5	(USEPA, 2005-2007)	pH<5.5	EcoSSL Guidance (USEPA, 2005-2007)	pH<5.5	EcoSSL Guidance (USEPA, 2005-2007)	--	NA	--	NA	--	NA	--
Calcium	no literature screening values available	chemical generally not considered in risk assessments	no literature screening values available	chemical generally not considered in risk assessments	no literature TRVs available	chemical generally not considered in risk assessments	no literature TRVs available	chemical generally not considered in risk assessments	--	no literature uptake model available	chemical generally not considered in risk assessments	no literature uptake model available	chemical generally not considered in risk assessments	no literature uptake model available	chemical generally not considered in risk assessments
Cyanide	NA	--	0.9	Region 4 ESL (USEPA, 2001)	0.04	USEPA, 1999	4.5	ATSDR, 2006 (NTP, 1993)	--	Cp = 0	assumed[j]	Ci = 0	assumed[j]	Cm = 0	assumed[j]
Iron	no literature screening values available	chemical generally not considered in risk assessments	no literature screening values available	chemical generally not considered in risk assessments	no literature TRVs available	chemical generally not considered in risk assessments	no literature TRVs available	chemical generally not considered in risk assessments	--	no literature uptake model available	chemical generally not considered in risk assessments	no literature uptake model available	chemical generally not considered in risk assessments	no literature uptake model available	chemical generally not considered in risk assessments
Magnesium	no literature screening values available	chemical generally not considered in risk assessments	no literature screening values available	chemical generally not considered in risk assessments	no literature TRVs available	chemical generally not considered in risk assessments	no literature TRVs available	chemical generally not considered in risk assessments	--	no literature uptake model available	chemical generally not considered in risk assessments	no literature uptake model available	chemical generally not considered in risk assessments	no literature uptake model available	chemical generally not considered in risk assessments
Potassium	no literature screening values available	chemical generally not considered in risk assessments	no literature screening values available	chemical generally not considered in risk assessments	no literature TRVs available	chemical generally not considered in risk assessments	no literature TRVs available	chemical generally not considered in risk assessments	--	no literature uptake model available	chemical generally not considered in risk assessments	no literature uptake model available	chemical generally not considered in risk assessments	no literature uptake model available	chemical generally not considered in risk assessments
Sodium	no literature screening values available	chemical generally not considered in risk assessments	no literature screening values available	chemical generally not considered in risk assessments	no literature TRVs available	chemical generally not considered in risk assessments	no literature TRVs available	chemical generally not considered in risk assessments	--	no literature uptake model available	chemical generally not considered in risk assessments	no literature uptake model available	chemical generally not considered in risk assessments	no literature uptake model available	chemical generally not considered in risk assessments
Polychlorinated Biphenyls (PCBs)															
Total PCBs	40	ORNL (Efroymson et al., 1997a)	1.0	Beyer, 1990[d]	0.09	BTAG (Platonow & Reinhart, 1973/CalEPA 2002)	0.36	BTAG (Simmons & McKee, 1992/CalEPA, 2002)	6.3	Cp = 0.01 * Cs	USEPA, 1999 (using Travis and Arms model, 1988; Kow for Aroclor 1254)	ln(Ci) = 1.361 * ln(Cs) + 1.41	Sample, 1998a	Cm = 0.025* Cd	USEPA, 1999 (Travis and Arms food-to mammal uptake model, 1988)[n]
Pesticides															
DDT and Metabolites	0.9	USEPA Ecotox, 2007b (Urzua et al.,1986)[b, l]	0.010	Van de Plassche (1994)[b,m,j]	0.009	BTAG (USEPA [Great Lakes], 1995/ CalEPA 2002)	0.147	EcoSSL Guidance (Wrenn et al., 1970/ USEPA, 2005-2007a)[b]	6.36	ln(Cp)= 0.7524 * ln(Cs) - 2.5119	USEPA, 2005-2007a[c]	Ci = 11.2 * Cs	USEPA, 2005-2007a	Cm = 4.83* Cd	USEPA, 2005-2007a
Alpha-Chlordane	0.224	Region 5 ESLs (USEPA, 2003[e])	0.0043	Van de Plassche (1994)[e,m,j]	2.1	ORNL (Sample et al., 1996)[e]	4.6	ORNL (Sample et al., 1996[e])	6.16	Cp = 0.19 * Cs	USEPA, 2007a (based on model for non-ionic chemicals)[e]	Ci = 24.3 * Cs	Jager model, 1998[e]	Cm = 1.2 * Cd	USEPA, 2007a[f]
Gamma-Chlordane	0.224	Region 5 ESLs (USEPA, 2003[e])	0.0043	Van de Plassche (1994)[e,m,j]	2.1	ORNL (Sample et al., 1996)[e]	4.6	ORNL (Sample et al., 1996[e])	6.16	Cp = 0.19 * Cs	USEPA, 2007a (based on model for non-ionic chemicals)[e]	Ci = 24.3 * Cs	Jager model, 1998[e]	Cm = 1.2 * Cd	USEPA, 2007a[f]
Dieldrin	1.0	USEPA Ecotox 2007b (Rajanna and De la Cruz,1977)[j,l]	0.05	Van de Plassche (1994)[m,j]	0.0709	EcoSSL Guidance (Nebeker, et al., 1992/ USEPA, 2005-2007)	0.015	EcoSSL Guidance ((Harr et al., 1970/USEPA, 2005-2007a)	4.55	Cp = 0.41 * Cs	USEPA, 2007a	Ci = 14.7 * Cs	USEPA, 2007a	Cm = 1.2 * Cd	USEPA, 2007a
Volatile Organic Compounds (VOCs)															
Methyl Acetate	no literature screening values available	--	no literature screening values available	--	no literature TRVs available	--	no literature TRVs available	--	0.18	no literature uptake concentration/model available	--	no literature uptake concentration/model available	--	no literature uptake concentration/model available	--
Semi-Volatile Organic Compounds (SVOCs)															
2,4-Dimethylphenol	no literature screening values available	--	no literature screening values available	--	no literature TRVs available	--	no literature TRVs available	--	2.3	no literature uptake concentration/model available	--	no literature uptake concentration/model available	--	no literature uptake concentration/model available	--
4-Methylphenol (p-Cresol)	10	USEPA Ecotox 2007b (Adema et al., 2001)[j]	0.5	Region 4 ESL (USEPA, 2001)	NA	--	NA	--	1.94	no literature uptake concentration/model available	--	no literature uptake concentration/model available	--	no literature uptake concentration/model available	--
Bis(2-ethylhexyl)phthalate	200	ORNL (Efroymson et al., 1997a)[g]	200	ORNL (Efroymson et al., 1997b)[h]	1.1	ORNL (Sample et al., 1996)	18.3	ORNL (Sample et al., 1996)	5.11	Cp = 0	assumed based on study by Staples et.al.,1997[j]	Ci = 1.995 * Cs	USEPA, 2007a (based on Jager model, 1998)	Cm = 0	assumed based on study by Staples et.al.,1997[j]
Butyl benzyl phthalate	no literature screening values available	--	no literature screening values available	--	no literature TRVs available	--	no literature TRVs available	--	4.91	no literature uptake concentration/model available	--	no literature uptake concentration/model available	--	no literature uptake concentration/model available	--
Carbazole	no literature screening values available	--	2800	USEPA Ecotox 2008 (Svedrup et al., 2006)[j]	NA	--	no literature TRVs available	--	3.23	log (Cp) = 1.588-0.573*(log Kow)	USEPA, 1999 (using Travis and Arms model, 1988)	Ci = 0.01 * Cs	Sverdrup, 2006.	Cm = 0.000012 * Cs	USEPA, 1999 (Travis and Arms food-to-mammal uptake model, 1988)[n]
Dibenzofuran	no literature screening values available	--	no literature screening values available	--	no literature TRVs available	--	no literature TRVs available	--	4.12	no literature uptake concentration/model available	--	no literature uptake concentration/model available	--	no literature uptake concentration/model available	--

Table A-1
Screening Levels, TRVs, and Tissue Uptake Concentrations

Attachment 1 to Technical Memorandum 4
PG&E Topock
Needles, California

	Screening Levels (mg/kg)				Proposed Toxicity Reference Values[a] (mg/kg-day)					Tissue Uptake Concentration (mg/kg)					
Analyte	**Plants**	**Source**	**Invertebrates**	**Source**	**Avian**	**Source**	**Mammalian**	**Source**	**Log K_{ow}[i]**	**Plant**	**Source**	**Invertebrate**	**Source**	**Mammal**	**Source**
Di-n-butylphthalate	200	ORNL (Efroymson et al., 1997a)	200	ORNL (Efroymson et al., 1997b)[h]	0.11	ORNL (Sample et al., 1996)	550	ORNL (Sample et al., 1996)	4.72	Cp = 0	assumed based on study by Staples et.al.,1997[j]	Ci = 12.7 * Cs	USEPA, 2007a (based on Jager model, 1998)	Cm = 0	assumed based on study by Staples et.al.,1997[j]
Pentachlorophenol	5.0	EcoSSL Guidance (USEPA, 2005-2007); geomean	31	EcoSSL Guidance (USEPA, 2005-2007); geomean	6.73	EcoSSL Guidance (Stedman et al, 1980/USEPA, 2005-2007)	8.42	EcoSSL Guidance (USEPA, 2005-2007a); geomean	5.12	Cp = 5.93 * Cs	USEPA, 2007a	Ci = 14.63 * Cs	USEPA, 2007a	Cm = 0.00452 * Cd + 0.198	USEPA, 2007a
Dioxin TEQ	--	--	--	--	1.4E-05	ORNL (Sample et.al., 1996)[k]	1.0E-06	ORNL (Sample et.al., 1996)[k]	6.8	Cp = 0.0056 * Cs	USEPA, 1999; for TCDD	ln(Ci) = 1.182 * ln(Cs) + 3.533	ORNL (Sample et.al., 1998a)	ln(Cm)= 1.0993 * ln(Cs) + 0.8113	ORNL (Sample et.al., 1998b)

Notes:
Example calulations for ecological comparion values for gamma-chlordane and cyanide are provided in Figures A-1 and A-2, respectively.
-- = not applicable
BTAG = Biological Technical Assistance Group
CalEPA = California Environmental Protection Agency
Cs = Concentration of chemical in soil
Cp = Concentration of chemical in plant tissue
Ci = Concentration of chemical in invertebrate tissue
Cm = Concentration of chemical in mammal tissue
Cd = Concentration of chemical in diet
DTSC = Department of Toxic Substances Control
EcoSSL = Ecological Soil Screening Levels
ECV = Ecological Comparison Values
HERD = Human and Ecological Risk Division
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram body weight per day
NA = not available
ORNL = Oak Ridge National Laboratory
TCDD = 2,3,7,8-tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
USEPA = United States Environmental Protection Agency

a. Proposed TRV is based on the most conservative and appropriate TRV found in the literature.
b. DDT used as surrogate.
c. Based on DDT and metabolites.
d. "B" Values, toxicity data indicate need for further assessment.
e. Chlordane used as surrogate; similar model used in the EcoSSL guidance (USEPA, 2007a).
f. Based on uptake model for dieldrin. There are no readily available literature soil-to-mammal uptake models for chlordane. It was assumed that the uptake of chlordane into mammal tissue would be similar to other organochlorine pesticides such as dieldrin.
Therefore, the mammal tissue uptake concentration for chlorade was based on the same uptake model used to estimate mammal tissue concentration of dieldrin.
g. Di-n-butylphthalate used as a surrogate.
h. Dimethylphthalate surrogate used.
i. Octanol-water partition coefficient (Log Kow) values were obtained from the Hazardous Substances Data Bank (HSDB, 2007) or the Syracuse Research Corporation (SRC) Chem Fate database or KowWin Demo (SRC, 2007). Chemicals with low Log Kows (<2.0) do not bioaccumulate (CalEPA, 1996 and USEPA, 2000); therefore, uptake models for these cl
j. See text for details.
k. For dioxins/furans, the lowest value based on the ORNL TRV was used (EcoSSL and BTAG do not present TRVs for dioxins/furans).
l. An uncertainty factor of 10 was applied to extrapolate from a low-effect to a no-effect toxicity value.
m. The screening values from this source were based on a total orgnaic content (TOC) of 10 percent (%); adjusted here using 1% TOC (USEPA, 2007a).
n. The food-to-mammal uptake model was selected based on the salt marsh harvest mouse, which was the most conservative value available in USEPA 1999 (Appendix D)

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Table A-2
Data for 2,4-Dimethylphenol, 4-Methylphenol,
Butyl Benzyl Phthalate, Dibenzofuran, and Methyl Acetate in Solid Matrices

Attachment 1 to Technical Memorandum 4
PG&E Topock
Needles, California

RFI Area	Location	Matrix	Sample ID	Sample Date	Top Depth (ft bgs)	Bottom Depth (ft bgs)	2,4-dimethylphenol (µg/kg)	4-methylphenol (µg/kg)	Butyl benzyl phthalate (µg/kg)	Dibenzofuran (µg/kg)	Methyl acetate (µg/kg)
300B	UA2-300B-1	Soil	300B-1-10001	9/23/2008	0	0.5	<330	<330	<330	<330	--
300B	UA2-300B-1	Soil	300B-1-10002	9/23/2008	0.5	1	<330	<330	<330	<330	--
300B	UA2-300B-1	Soil	300B-1-10003	10/23/2008	2.5	3	<330	460	<330	<330	<6.3
300B	UA2-300B-1	Soil	300B-1-10004	10/23/2008	5.5	6	<330	<330	<330	<330	--
300B	UA2-300B-2	Soil	300B-2-10005	10/3/2008	0	0.5	<330	<330	<330	<330	--
300B	UA2-300B-2	Soil	300B-2-10006	10/3/2008	0.5	1	<330	<330	<330	<330	--
300B	UA2-300B-2	Soil	300B-2-10007	10/3/2008	2	3	<330	<330	<330	<330	--
300B	UA2-300B-3	Soil	300B-3-10009	10/3/2008	0	0.5	<330	<330	<330	<330	--
300B	UA2-300B-3	Soil	300B-3-10010	10/3/2008	0.5	1	<330	<330	<330	<330	--
300B	UA2-300B-3	Soil	300B-3-10011	10/3/2008	0.5	1	<330	<330	<330	<330	--
300B	UA2-300B-3	Soil	300B-3-10012	10/3/2008	2	3	<330	<330	<330	<330	--
300B	UA2-300B-3	Soil	300B-3-10013	10/3/2008	5	6	<330	<330	<330	<330	--
300B	UA2-300B-4	Soil	300B-4-10014	10/3/2008	0	0.5	<330	<330	<330	<330	--
300B	UA2-300B-4	Soil	300B-4-10015	10/3/2008	0.5	1	<330	<330	<330	<330	--
300B	UA2-300B-4	Soil	300B-4-10016	10/3/2008	2	3	<330	<330	<330	<330	--
300B	UA2-300B-5	Soil	300B-5-10018	10/3/2008	0	0.5	<330	<330	<330	<330	--
300B	UA2-300B-5	Soil	300B-5-10019	10/3/2008	0.5	1	<330	<330	<330	<330	--
300B	UA2-300B-5	Soil	300B-5-10020	10/3/2008	2	3	<340	<340	<340	<340	<7.7
AOC10	AOC10-1	Soil	AOC10-1-5001	10/2/2008	0	0.5	<330	<330	<330	<330	--
AOC10	AOC10-1	Soil	AOC10-1-5002	10/2/2008	2	3	<330	<330	<330	<330	--
AOC10	AOC10-1	Soil	AOC10-1-5003	10/2/2008	5	6	<340	<340	<340	<340	--
AOC10	AOC10-1	Soil	AOC10-1-5004	10/2/2008	9	10	<330	<330	<330	<330	--
AOC10	AOC10-2	Soil	AOC10-2-5005	10/2/2008	0	0.5	<330	<330	<330	<330	--
AOC10	AOC10-2	Soil	AOC10-2-5006	10/2/2008	2	3	<340	<340	<340	<340	--
AOC10	AOC10-2	Soil	AOC10-2-5007	10/2/2008	5	6	<340	<340	<340	<340	--
AOC10	AOC10-2	Soil	AOC10-2-5008	10/2/2008	7	8	<340	<340	<340	<340	--
AOC10	AOC10-3	Soil	AOC10-3-5009	9/19/2008	0	0.5	<330	<330	<330	<330	--
AOC10	AOC10-3	Soil	AOC10-3-5010	9/19/2008	0	0.5	<330	<330	<330	<330	--
AOC10	AOC10-3	Soil	AOC10-3-5011	9/19/2008	2	3	<340	<340	<340	<340	<7.2
AOC10	AOC10-3	Soil	AOC10-3-5012	9/19/2008	5	6	<340	<340	<340	<340	--
AOC10	AOC10-4	Soil	AOC10-4-5014	9/19/2008	0	0.5	<330	<330	<330	<330	--
AOC10	AOC10-4	Soil	AOC10-4-5015	9/19/2008	2	3	<340	<340	<340	<340	--
AOC10	AOC10-4	Soil	AOC10-4-5016	9/19/2008	5	6	<340	<340	<340	<340	--
AOC10	AOC10-5	Soil	AOC10-5-5018	9/19/2008	0	0.5	<1700	<1700	<1700	<1700	--
AOC10	AOC10-5	Soil	AOC10-5-5019	9/19/2008	2	3	<340	<340	<340	<340	<7.7
AOC10	AOC10-5	Soil	AOC10-5-5020	9/19/2008	5	6	<340	<340	<340	<340	--
AOC10	AOC10-5	Soil	AOC10-5-5021	9/19/2008	5	6	<340	<340	<340	<340	--
AOC10	AOC10-6	Soil	AOC10-6-5023	9/20/2008	0	0.5	<330	<330	<330	<330	--
AOC10	AOC10-6	Soil	AOC10-6-5024	9/20/2008	2	3	<840	<840	<840	<840	--
AOC10	AOC10-7	Soil	AOC10-7-5027	9/20/2008	0	0.5	<330	<330	<330	<330	--
AOC10	AOC10-7	Soil	AOC10-7-5028	9/20/2008	2	3	<330	<330	<330	<330	--
AOC10	AOC10-7	Soil	AOC10-7-5029	9/20/2008	5	6	<340	<340	<340	<340	--

Table A-2
Data for 2,4-Dimethylphenol, 4-Methylphenol,
Butyl Benzyl Phthalate, Dibenzofuran, and Methyl Acetate in Solid Matrices

Attachment 1 to Technical Memorandum 4
PG&E Topock
Needles, California

RFI Area	Location	Matrix	Sample ID	Sample Date	Top Depth (ft bgs)	Bottom Depth (ft bgs)	2,4-dimethylphenol (µg/kg)	4-methylphenol (µg/kg)	Butyl benzyl phthalate (µg/kg)	Dibenzofuran (µg/kg)	Methyl acetate (µg/kg)
AOC10	AOC10-8	Soil	AOC10-8-5031	8/22/2008	0	0.5	<330	<330	<330	<330	--
AOC10	AOC10-8	Soil	AOC10-8-5033	8/22/2008	0	0.5	<330	<330	<330	<330	--
AOC10	AOC10a-1	Soil	AOC10a-1-5036	10/17/2008	0	0.5	<21000	<21000	<21000	<21000	--
AOC10	AOC10b-1	Soil	AOC10b-1-5040	9/30/2008	0	0.5	<330	<330	<330	<330	--
AOC10	AOC10b-1	Soil	AOC10b-1-5041	9/30/2008	2	3	<330	<330	<330	<330	<6.9
AOC10	AOC10b-1	Soil	AOC10b-1-5042	9/30/2008	2	3	<330	<330	<330	<330	<6.8
AOC10	AOC10b-1	Soil	AOC10b-1-5043	9/30/2008	5	6	<330	<330	<330	<330	--
AOC10	AOC10b-1	Soil	AOC10b-1-5044	9/30/2008	9	10	<330	<330	<330	<330	--
AOC10	AOC10b-2	Soil	AOC10b-2-5045	9/30/2008	0	0.5	<330	<330	<330	<330	--
AOC10	AOC10b-2	Soil	AOC10b-2-5046	9/30/2008	2	3	<330	<330	<330	<330	--
AOC10	AOC10b-2	Soil	AOC10b-2-5047	9/30/2008	5	6	<330	<330	<330	<330	--
AOC10	AOC10b-2	Soil	AOC10b-2-5048	9/30/2008	9	10	<330	<330	<330	<330	--
AOC10	AOC10b-3	Soil	AOC10b-3-5049	9/30/2008	0	0.5	<330	<330	<330	<330	--
AOC10	AOC10b-3	Soil	AOC10b-3-5050	10/1/2008	2	3	<340	<340	<340	<340	--
AOC10	AOC10b-3	Soil	AOC10b-3-5051	10/1/2008	5	6	<340	<340	<340	<340	--
AOC10	AOC10b-3	Soil	AOC10b-3-5052	10/1/2008	5	6	<340	<340	<340	<340	--
AOC10	AOC10b-3	Soil	AOC10b-3-5053	10/1/2008	9	10	<340	<340	<340	<340	--
AOC10	AOC10b-4	Soil	AOC10b-4-5054	9/30/2008	0	0.5	<330	<330	<330	<330	--
AOC10	AOC10b-4	Soil	AOC10b-4-5055	9/30/2008	2	3	<330	<330	<330	<330	--
AOC10	AOC10b-4	Soil	AOC10b-4-5056	9/30/2008	5	6	<330	<330	<330	<330	--
AOC10	AOC10b-4	Soil	AOC10b-4-5057	9/30/2008	9	10	<340	<340	<340	<340	--
AOC10	AOC10c-1	Soil	AOC10c-1-5058	10/1/2008	0	0.5	<330	<330	<330	<330	--
AOC10	AOC10c-1	Soil	AOC10c-1-5059	10/1/2008	2	3	<330	<330	<330	<330	<8.9
AOC10	AOC10c-1	Soil	AOC10c-1-5060	10/1/2008	5	6	<330	<330	<330	<330	--
AOC10	AOC10c-1	Soil	AOC10c-1-5061	10/1/2008	9	10	<340	<340	<340	<340	--
AOC10	AOC10c-2	Soil	AOC10c-2-5062	10/1/2008	0	0.5	<330	<330 J	<330	<330	--
AOC10	AOC10c-2	Soil	AOC10c-2-5063	10/1/2008	2	3	<330	<330 J	<330	<330	<5.8
AOC10	AOC10c-2	Soil	AOC10c-2-5064	10/1/2008	2	3	<330	<330 J	<330	<330	<6.3
AOC10	AOC10c-2	Soil	AOC10c-2-5065	10/1/2008	5	6	<330	<330	<330	<330	--
AOC10	AOC10c-2	Soil	AOC10c-2-5066	10/1/2008	9	10	<340	<340	<340	<340	--
AOC10	AOC10c-3	Soil	AOC10c-3-5067	10/2/2008	0	0.5	<340	<340	<340	<340	--
AOC10	AOC10c-3	Soil	AOC10c-3-5068	10/2/2008	2	3	<340	<340	<340	<340	--
AOC10	AOC10c-3	Soil	AOC10c-3-5069	10/2/2008	2	3	<340	<340	<340	<340	--
AOC10	AOC10c-3	Soil	AOC10c-3-5070	10/2/2008	5	6	<330	<330	<330	<330	--
AOC10	AOC10c-3	Soil	AOC10c-3-5071	10/2/2008	9	10	<340	<340	<340	<340	--
AOC10	AOC10c-4	Soil	AOC10c-4-5072	10/1/2008	0	0.5	<340	<340 J	<340	<340	--
AOC10	AOC10c-4	Soil	AOC10c-4-5073	10/1/2008	2	3	<340	<340	<340	<340	--
AOC10	AOC10c-4	Soil	AOC10c-4-5074	10/1/2008	5	6	<340	<340	<340	<340	--
AOC10	AOC10c-4	Soil	AOC10c-4-5075	10/1/2008	9	10	<340	<340	<340	<340	--
AOC10	AOC10c-5	Soil	AOC10c-5-5076	10/1/2008	0	0.5	<330	<330 J	<330	<330	--
AOC10	AOC10c-5	Soil	AOC10c-5-5077	10/1/2008	2	3	<340	<340 J	<340	<340	--
AOC10	AOC10c-5	Soil	AOC10c-5-5078	10/1/2008	5	6	<340	<340	<340	<340	--
AOC10	AOC10c-5	Soil	AOC10c-5-5079	10/1/2008	9	10	<340	<340	<340	<340	--

Table A-2
Data for 2,4-Dimethylphenol, 4-Methylphenol,
Butyl Benzyl Phthalate, Dibenzofuran, and Methyl Acetate in Solid Matrices

Attachment 1 to Technical Memorandum 4
PG&E Topock
Needles, California

RFI Area	Location	Matrix	Sample ID	Sample Date	Top Depth (ft bgs)	Bottom Depth (ft bgs)	2,4-dimethylphenol (µg/kg)	4-methylphenol (µg/kg)	Butyl benzyl phthalate (µg/kg)	Dibenzofuran (µg/kg)	Methyl acetate (µg/kg)
AOC10	AOC10d-1	Soil	AOC10d-1-5080	9/18/2008	0	0.5	<330	<330	<330	<330	--
AOC10	AOC10d-1	Soil	AOC10d-1-5081	9/18/2008	2	3	<340	<340	<340	<340	--
AOC10	AOC10d-1	Soil	AOC10d-1-5082	9/18/2008	5	6	<340	<340	<340	<340	--
AOC10	AOC10d-1	Soil	AOC10d-1-5083	9/18/2008	5	6	<340	<340	<340	<340	--
AOC10	AOC10d-2	Soil	AOC10d-2-5085	9/17/2008	0	0.5	<830	<830	<830	<830	--
AOC10	AOC10d-2	Soil	AOC10d-2-5086	9/17/2008	2	3	<340	<340	<340	<340	<7.2
AOC10	AOC10d-2	Soil	AOC10d-2-5087	9/17/2008	5	6	<340	<340	<340	<340	--
AOC10	AOC10d-3	Soil	AOC10d-3-5089	9/17/2008	0	0.5	<330	<330	<330	<330	--
AOC10	AOC10d-3	Soil	AOC10d-3-5090	9/18/2008	2	3	<340	<340	<340	<340	<6.8
AOC10	AOC10d-3	Soil	AOC10d-3-5091	9/18/2008	5	6	<340	<340	<340	<340	--
AOC10	AOC10d-3	Soil	AOC10d-3-5092	9/18/2008	5	6	<340	<340	<340	<340	--
AOC10	AOC10d-4	Soil	AOC10d-4-5094	9/18/2008	0	0.5	<340	<340	<340	<340	--
AOC10	AOC10d-4	Soil	AOC10d-4-5095	9/18/2008	2	3	<350	<350	<350	<350	--
AOC10	AOC10d-4	Soil	AOC10d-4-5096	9/18/2008	5	6	<340	<340	<340	<340	--
AOC11	AOC11a-1	Soil	AOC11a-1-6001	9/21/2008	0	0.5	<330	<330	<330	<330	--
AOC11	AOC11a-1	Soil	AOC11a-1-6002	9/21/2008	2	3	<340	<340	<340	<340	<8.6
AOC11	AOC11a-1	Soil	AOC11a-1-6003	9/21/2008	5	6	<340	<340	<340	<340	--
AOC11	AOC11a-2	Soil	AOC11a-2-6005	9/21/2008	0	0.5	<340	<340	<340	<340	--
AOC11	AOC11a-2	Soil	AOC11a-2-6006	9/21/2008	2	3	<350	<350	<350	<350	<8.2
AOC11	AOC11a-2	Soil	AOC11a-2-6007	9/21/2008	5	6	<340	<340	<340	<340	--
AOC11	AOC11a-3	Soil	AOC11a-3-6009	9/20/2008	0	0.5	<340	<340	<340	<340	--
AOC11	AOC11a-3	Soil	AOC11a-3-6010	9/20/2008	2	3	<340	<340	<340	<340	<9.3
AOC11	AOC11a-3	Soil	AOC11a-3-6011	9/20/2008	2	3	<340	<340	<340	<340	<7.4
AOC11	AOC11a-3	Soil	AOC11a-3-6012	9/20/2008	5	6	<340	<340	<340	<340	--
AOC11	AOC11a-4	Soil	AOC11a-4-6014	9/20/2008	0	0.5	<340	<340	<340	<340	--
AOC11	AOC11a-4	Soil	AOC11a-4-6015	9/20/2008	2	3	<840	<840	<840	<840	--
AOC11	AOC11a-4	Soil	AOC11a-4-6016	9/20/2008	5	6	<340	<340	<340	<340	--
AOC11	AOC11a-5	Soil	AOC11a-5-6018	9/21/2008	0	0.5	<340	<340	<340	<340	--
AOC11	AOC11a-5	Soil	AOC11a-5-6019	9/21/2008	2	3	<340	<340	<340	<340	--
AOC11	AOC11a-5	Soil	AOC11a-5-6020	9/21/2008	5	6	<340	<340	<340	<340	--
AOC11	AOC11a-5	Soil	AOC11a-5-6021	9/21/2008	5	6	<340	<340	<340	<340	--
AOC11	AOC11b-1	Soil	AOC11b-1-6023	9/17/2008	0	0.5	<830	<830	<830	<830	--
AOC11	AOC11b-1	Soil	AOC11b-1-6024	9/17/2008	0	0.5	<830	<830	<830	<830	--
AOC11	AOC11b-1	Soil	AOC11b-1-6025	9/17/2008	2	3	<830	<830	<830	<830	<5.6
AOC11	AOC11b-1	Soil	AOC11b-1-6026	9/17/2008	5	6	<850	<850	<850	<850	--
AOC11	AOC11b-2	Soil	AOC11b-2-6028	9/17/2008	0	0.5	<830	<830	<830	<830	--
AOC11	AOC11b-2	Soil	AOC11b-2-6029	9/17/2008	2	3	<340	<340	<340	<340	--
AOC11	AOC11b-2	Soil	AOC11b-2-6030	9/17/2008	5	6	<340	<340	<340	<340	--
AOC11	AOC11c-1	Soil	AOC11c-1-6032	9/21/2008	0	0.5	<330	<330	<330	<330	--
AOC11	AOC11c-1	Soil	AOC11c-1-6033	9/22/2008	2	3	<340	<340	<340	<340	--
AOC11	AOC11c-1	Soil	AOC11c-1-6034	9/22/2008	2	3	<340	<340	<340	<340	--
AOC11	AOC11c-1	Soil	AOC11c-1-6035	9/22/2008	5	6	<340	<340	<340	<340	--

Table A-2
Data for 2,4-Dimethylphenol, 4-Methylphenol,
Butyl Benzyl Phthalate, Dibenzofuran, and Methyl Acetate in Solid Matrices

Attachment 1 to Technical Memorandum 4
PG&E Topock
Needles, California

RFI Area	Location	Matrix	Sample ID	Sample Date	Top Depth (ft bgs)	Bottom Depth (ft bgs)	2,4-dimethylphenol (µg/kg)	4-methylphenol (µg/kg)	Butyl benzyl phthalate (µg/kg)	Dibenzofuran (µg/kg)	Methyl acetate (µg/kg)
AOC11	AOC11c-2	Soil	AOC11c-2-6037	9/21/2008	0	0.5	<330	<330	<330	<330	--
AOC11	AOC11c-2	Soil	AOC11c-2-6038	9/22/2008	2	3	<350	<350	<350	<350	<16 J
AOC11	AOC11c-2	Soil	AOC11c-2-6039	9/22/2008	5	6	<340	<340	<340	<340	--
AOC11	AOC11d-1	Soil	AOC11d-1-6041	9/23/2008	0	0.5	<340	<340	<340	<340	--
AOC11	AOC11d-1	Soil	AOC11d-1-6042	9/23/2008	0	0.5	<330	<330	<330	<330	--
AOC11	AOC11d-1	Soil	AOC11d-1-6043	9/23/2008	2.5	3	<340	<340	<340	<340	<4.4
AOC11	AOC11d-1	Soil	AOC11d-1-6044	9/23/2008	5	6	<340	<340	<340	<340	--
AOC11	AOC11d-1	Soil	AOC11d-1-6045	9/23/2008	9	10	<340	<340	<340	<340	--
AOC11	AOC11e-1	Soil	AOC11e-1-6046	9/23/2008	0	0.5	<330	<330	<330	<330	--
AOC11	AOC11e-1	Soil	AOC11e-1-6047	9/23/2008	2.5	3	<330	<330	<330	<330	--
AOC11	AOC11e-1	Soil	AOC11e-1-6048	9/23/2008	5.5	6	<340	<340	<340	<340	--
AOC11	AOC11e-1	Soil	AOC11e-1-6049	9/23/2008	9.5	10	<340	<340	<340	<340	--
AOC11	AOC11e-2	Soil	AOC11e-2-6050	9/24/2008	0	0.5	<330	<330	<330	<330	--
AOC11	AOC11e-2	Soil	AOC11e-2-6051	9/24/2008	2	3	<330	<330	<330	<330	17
AOC11	AOC11e-2	Soil	AOC11e-2-6052	9/24/2008	2	3	<360	<360	<360	<360	--
AOC11	AOC11e-2	Soil	AOC11e-2-6053	9/24/2008	5	6	<330	<330	<330	<330	--
AOC11	AOC11e-2	Soil	AOC11e-2-6054	9/24/2008	9	10	<350	<350	<350	<350	--
AOC11	AOC11e-SS1	Soil	AOC11e-SS-1-6075	9/23/2008	0	0.5	<330	<330	<330	<330	--
AOC11	AOC11e-SS1	Soil	AOC11e-SS-1-6076	9/23/2008	2.5	3	<330	<330	<330	<330	--
AOC11	AOC11e-SS1	Soil	AOC11e-SS-1-6077	9/23/2008	5.5	6	<330	<330	<330	<330	--
AOC11	AOC11e-SS1	Soil	AOC11e-SS-1-6078	9/23/2008	9.5	10	<340	<340	<340	<340	--
AOC11	AOC11e-SS2	Soil	AOC11e-SS-2-6079	9/23/2008	0	0.5	<330	<330	<330	<330	--
AOC11	AOC11e-SS2	Soil	AOC11e-SS-2-6080	9/23/2008	2.5	3	<340	<340	<340	<340	--
AOC11	AOC11e-SS2	Soil	AOC11e-SS-2-6081	9/23/2008	5.5	6	<340	<340	<340	<340	--
AOC11	AOC11e-SS2	Soil	AOC11e-SS-2-6082	9/23/2008	5.5	6	<340	<340	<340	<340	--
AOC11	AOC11e-SS2	SOIL	AOC11e-SS-2-6083	9/23/2008	9.5	10	<350	<350	<350	<350	--
AOC12	AOC12a-T1a	Soil	AOC12a-T1a-7001	9/22/2008	0	0.5	<330	<330	<330	<330	--
AOC12	AOC12a-T1a	Soil	AOC12a-T1a-7002	9/22/2008	2	3	<330	<330	<330	<330	<4.1
AOC12	AOC12a-T1a	Soil	AOC12a-T1b-7003	9/22/2008	7	8	<340	<340	<340	<340	--
AOC12	AOC12a-T1c	Soil	AOC12a-T1c-7004	9/22/2008	7	8	<340	<340	<340	<340	--
AOC12	AOC12a-T2a	Soil	AOC12a-T2a-7005	9/22/2008	6	7	<340	<340	<340	<340	--
AOC12	AOC12a-T2b	Soil	AOC12a-T2b-7006	9/22/2008	7	8	<340	<340	<340	<340	--
AOC12	AOC12b-T1a	Soil	AOC12b-T1a-7009	9/20/2008	2	3	<340	<340	<340	<340	--
AOC12	AOC12b-T1b	Soil	AOC12b-T1b-7010	9/20/2008	2	3	<350	<350	<350	<350	--
AOC12	AOC12c-T1a	Soil	AOC12c-T1a-7014	9/20/2008	10	11	<350	<350	<350	<350	--
AOC12	AOC12c-T1a	Soil	AOC12c-T1b-7015	9/20/2008	0	0.5	<330	<330	<330	<330	--
AOC12	AOC12c-T1a	Soil	AOC12c-T1b-7016	9/20/2008	2	3	<340	<340	<340	<340	<6.5
AOC12	AOC12c-T1b	Soil	AOC12c-T1c-7017	9/20/2008	10	11	<340	<340	<340	<340	--
AOC12	AOC12c-T1b	Soil	AOC12c-T1c-7023	9/22/2008	3	4	<340	<340	<340	<340	--
AOC12	AOC12c-T2a	Soil	AOC12c-T2a-7018	9/20/2008	7	8	<350	<350	<350	<350	--
AOC12	AOC12c-T2b	Soil	AOC12c-T2b-7019	9/20/2008	7	8	<340	<340	<340	<340	--
AOC12	AOC12c-T1b	Soil	AOC12c-T2c-7020	9/20/2008	2	3	<340	<340	<340	<340	--
AOC12	AOC12c-T1c	Soil	AOC12c-T2d-7021	9/20/2008	10	11	<350	<350	<350	<350	--
AOC12	AOC12c-T1c	Soil	AOC12c-T2d-7022	9/20/2008	10	11	<350	<350	<350	<350	--

Table A-2
Data for 2,4-Dimethylphenol, 4-Methylphenol,
Butyl Benzyl Phthalate, Dibenzofuran, and Methyl Acetate in Solid Matrices

Attachment 1 to Technical Memorandum 4
PG&E Topock
Needles, California

RFI Area	Location	Matrix	Sample ID	Sample Date	Top Depth (ft bgs)	Bottom Depth (ft bgs)	2,4-dimethylphenol (µg/kg)	4-methylphenol (µg/kg)	Butyl benzyl phthalate (µg/kg)	Dibenzofuran (µg/kg)	Methyl acetate (µg/kg)
AOC14	AOC14-10	Soil	AOC14-10-8050	10/1/2008	0	0.5	<330	<330	<330	<330	--
AOC14	AOC14-10	Soil	AOC14-10-8051	10/1/2008	2	3	<330	<330	<330	<330	<4.7
AOC14	AOC14-10	Soil	AOC14-10-8052	10/1/2008	5	6	<330	<330	<330	<330	--
AOC14	AOC14-10	Soil	AOC14-10-8053	10/1/2008	5	6	<330	<330	<330	<330	--
AOC14	AOC14-10	Soil	AOC14-10-8054	10/1/2008	9	10	<340	<340	<340	<340	--
AOC14	AOC14-10	Soil	AOC14-10-8055	10/1/2008	14	15	<330	<330	<330	<330	--
AOC14	AOC14-11	Soil	AOC14-11-8056	10/1/2008	5	6	<330	<330	<330	<330	--
AOC14	AOC14-11	Soil	AOC14-11-8057	10/1/2008	9	10	<330	<330	<330	<330	--
AOC14	AOC14-11	Soil	AOC14-11-8058	10/1/2008	14	15	<340	<340	<340	<340	--
AOC14	AOC14-12	Soil	AOC14-12-8059	9/30/2008	5	6	<330	<330	<330	<330	--
AOC14	AOC14-12	Soil	AOC14-12-8060	9/30/2008	9	10	<330	<330	<330	<330	--
AOC14	AOC14-12	Soil	AOC14-12-8061	9/30/2008	14	15	<330	<330	<330	<330	--
AOC14	AOC14-13	Soil	AOC14-13-8062	9/30/2008	5	6	<330	<330	<330	<330	--
AOC14	AOC14-13	Soil	AOC14-13-8063	9/30/2008	9	10	<330	<330	<330	<330	--
AOC14	AOC14-13	Soil	AOC14-13-8064	9/30/2008	14	15	<340	<340	<340	<340	--
AOC14	AOC14-13	Soil	AOC14-13-8065	9/30/2008	14	15	<340	<340	<340	<340	--
AOC14	AOC14-13	Debris	AOC14-13-8089	10/1/2008	0.5	1.5	<330 J	<330 J	<330 J	<330 J	--
AOC14	AOC14-1	Soil	AOC14-1-8001	9/30/2008	0	0.5	<330	<330	<330	<330	--
AOC14	AOC14-1	Soil	AOC14-1-8002	9/30/2008	2	3	<340	<340	<340	<340	<6.7
AOC14	AOC14-1	Soil	AOC14-1-8003	9/30/2008	5	6	<330	<330	<330	<330	--
AOC14	AOC14-1	Soil	AOC14-1-8004	9/30/2008	9	10	<330	<330	<330	<330	--
AOC14	AOC14-1	Soil	AOC14-1-8005	9/30/2008	14	15	<340	<340	<340	<340	--
AOC14	AOC14-2	Soil	AOC14-2-8006	9/30/2008	0	0.5	<340	430	<340	<340	--
AOC14	AOC14-2	Soil	AOC14-2-8007	9/30/2008	2	3	<350	<350	<350	<350	<8.9
AOC14	AOC14-2	Soil	AOC14-2-8008	9/30/2008	5	6	<340	<340	<340	<340	--
AOC14	AOC14-2	Soil	AOC14-2-8009	9/30/2008	9	10	<330	<330	<330	<330	--
AOC14	AOC14-2	Soil	AOC14-2-8010	9/30/2008	9	10	<330	<330	<330	<330	--
AOC14	AOC14-2	Soil	AOC14-2-8011	9/30/2008	14	15	<340	<340	<340	<340	--
AOC14	AOC14-2	WhitePowder	AOC14-2-8088	10/1/2008	3	3.25	<370 J	<370 J	<370 J	<370 J	--
AOC14	AOC14-3	Soil	AOC14-3-8012	10/1/2008	0	0.5	<330	<330	<330	<330	--
AOC14	AOC14-3	Soil	AOC14-3-8013	10/1/2008	2	3	<330	<330	<330	<330	<5.1
AOC14	AOC14-3	Soil	AOC14-3-8014	10/1/2008	5	6	<330	<330	<330	<330	--
AOC14	AOC14-3	Soil	AOC14-3-8015	10/1/2008	9	10	<330	<330	<330	<330	--
AOC14	AOC14-3	Soil	AOC14-3-8016	10/1/2008	14	15	<330	<330	<330	<330	--
AOC14	AOC14-4	Soil	AOC14-4-8017	10/1/2008	0	0.5	<330	<330	<330	<330	--
AOC14	AOC14-4	Soil	AOC14-4-8018	10/1/2008	2	3	<330	<330	<330	<330	<4.6
AOC14	AOC14-4	Soil	AOC14-4-8019	10/1/2008	5	6	<330	<330	<330	<330	--
AOC14	AOC14-4	Soil	AOC14-4-8020	10/1/2008	9	10	<330	<330	<330	<330	--
AOC14	AOC14-4	Soil	AOC14-4-8021	10/1/2008	9	10	<330	<330	<330	<330	--
AOC14	AOC14-4	Soil	AOC14-4-8022	10/1/2008	14	15	<330	<330	<330	<330	--
AOC14	AOC14-5	Soil	AOC14-5-8023	10/2/2008	0	0.5	<330	<330	<330	<330	--
AOC14	AOC14-5	Soil	AOC14-5-8024	10/2/2008	2	3	<830	<830	<830	<830	<4.6
AOC14	AOC14-5	Soil	AOC14-5-8025	10/2/2008	5	6	<330	<330	<330	<330	--
AOC14	AOC14-5	Soil	AOC14-5-8026	10/2/2008	9	10	<330	<330	<330	<330	--
AOC14	AOC14-5	Soil	AOC14-5-8027	10/2/2008	14	15	<330	<330	<330	<330	--

Table A-2
Data for 2,4-Dimethylphenol, 4-Methylphenol,
Butyl Benzyl Phthalate, Dibenzofuran, and Methyl Acetate in Solid Matrices

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Needles, California

RFI Area	Location	Matrix	Sample ID	Sample Date	Top Depth (ft bgs)	Bottom Depth (ft bgs)	2,4-dimethylphenol (µg/kg)	4-methylphenol (µg/kg)	Butyl benzyl phthalate (µg/kg)	Dibenzofuran (µg/kg)	Methyl acetate (µg/kg)
AOC14	AOC14-6	Soil	AOC14-6-8028	10/2/2008	0	0.5	<330	<330	<330	<330	--
AOC14	AOC14-6	Soil	AOC14-6-8029	10/2/2008	2	3	<330	<330	<330	<330	--
AOC14	AOC14-6	Soil	AOC14-6-8030	10/2/2008	5	6	<330	<330	<330	<330	--
AOC14	AOC14-6	Soil	AOC14-6-8031	10/2/2008	9	10	<330	<330	<330	<330	--
AOC14	AOC14-6	Soil	AOC14-6-8032	10/2/2008	9	10	<330	<330	<330	<330	--
AOC14	AOC14-6	Soil	AOC14-6-8033	10/2/2008	14	15	<330	<330	<330	<330	--
AOC14	AOC14-7	Soil	AOC14-7-8034	10/2/2008	0	0.5	<830	<830	<830	<830	--
AOC14	AOC14-7	Soil	AOC14-7-8035	10/2/2008	2	3	<830	<830	<830	<830	<4.1
AOC14	AOC14-7	Soil	AOC14-7-8036	10/2/2008	5	6	<330	<330	<330	<330	--
AOC14	AOC14-7	Soil	AOC14-7-8037	10/2/2008	9	10	<340	<340	<340	<340	--
AOC14	AOC14-7	Soil	AOC14-7-8038	10/2/2008	14	15	<330	<330	<330	<330	--
AOC14	AOC14-8	Soil	AOC14-8-8039	10/2/2008	0	0.5	<330	<330	<330	<330	--
AOC14	AOC14-8	Soil	AOC14-8-8040	10/2/2008	2	3	<330	<330	<330	<330	<4.7
AOC14	AOC14-8	Soil	AOC14-8-8041	10/2/2008	5	6	<330	<330	<330	<330	--
AOC14	AOC14-8	Soil	AOC14-8-8042	10/2/2008	9	10	<330	<330	<330	<330	--
AOC14	AOC14-8	Soil	AOC14-8-8043	10/2/2008	9	10	<330	<330	<330	<330	--
AOC14	AOC14-8	Soil	AOC14-8-8044	10/2/2008	14	15	<340	<340	<340	<340	--
AOC14	AOC14-9	Soil	AOC14-9-8045	10/1/2008	0	0.5	<330	<330	<330	<330	--
AOC14	AOC14-9	Soil	AOC14-9-8046	10/1/2008	2	3	<330	<330	<330	<330	--
AOC14	AOC14-9	Soil	AOC14-9-8047	10/1/2008	5	6	<330	<330	<330	<330	--
AOC14	AOC14-9	Soil	AOC14-9-8048	10/1/2008	9	10	<330	<330	<330	<330	--
AOC14	AOC14-9	Soil	AOC14-9-8049	10/1/2008	14	15	<340	<340	<340	<340	--
AOC14	AOC14-SS1	Soil	AOC14-SS-1-8066	10/1/2008	0	0.5	<330	<330	<330	<330	--
AOC14	AOC14-SS1	Soil	AOC14-SS-1-8067	10/1/2008	2	3	<340	<340	<340	<340	--
AOC14	AOC14-SS1	Soil	AOC14-SS-1-8068	10/1/2008	5	6	<340	<340	<340	<340	--
AOC14	AOC14-SS1	Soil	AOC14-SS-1-8069	10/1/2008	9	10	<330	<330	<330	<330	--
AOC14	AOC14-SS1	Soil	AOC14-SS-1-8070	10/1/2008	14	15	<340	<340	<340	<340	--
AOC14	AOC14-SS2	Soil	AOC14-SS-2-8071	10/1/2008	0	0.5	<3300	<3300	<3300	<3300	--
AOC14	AOC14-SS2	Soil	AOC14-SS-2-8072	10/1/2008	2	3	<330	<330	<330	<330	--
AOC14	AOC14-SS2	Soil	AOC14-SS-2-8073	10/1/2008	5	6	<340	<340	<340	<340	--
AOC14	AOC14-SS2	Soil	AOC14-SS-2-8074	10/1/2008	9	10	<340	<340	<340	<340	--
AOC14	AOC14-SS2	Soil	AOC14-SS-2-8075	10/1/2008	14	15	<330	<330	<330	<330	--
AOC14	AOC14-SS2	Soil	AOC14-SS-2-8076	10/1/2008	14	15	<330	<330	<330	<330	--
AOC14	AOC14-SS3	Soil	AOC14-SS-3-8077	10/2/2008	0	0.5	<330	<330	<330	<330	--
AOC14	AOC14-SS3	Soil	AOC14-SS-3-8078	10/2/2008	2	3	<330	<330	<330	<330	--
AOC14	AOC14-SS3	Soil	AOC14-SS-3-8079	10/2/2008	5	6	<330	<330	<330	<330	--
AOC14	AOC14-SS3	Soil	AOC14-SS-3-8080	10/2/2008	9	10	<330	<330	<330	<330	--
AOC14	AOC14-SS3	Soil	AOC14-SS-3-8081	10/2/2008	14	15	<330	<330	<330	<330	--
AOC14	AOC14-SS4	Soil	AOC14-SS-4-8082	10/2/2008	0	0.5	<330	<330	<330	<330	--
AOC14	AOC14-SS4	Soil	AOC14-SS-4-8083	10/2/2008	2	3	<330	<330	<330	<330	--
AOC14	AOC14-SS4	Soil	AOC14-SS-4-8084	10/2/2008	5	6	<330	<330	<330	<330	--
AOC14	AOC14-SS4	Soil	AOC14-SS-4-8085	10/2/2008	9	10	<330	<330	<330	<330	--
AOC14	AOC14-SS4	Soil	AOC14-SS-4-8086	10/2/2008	14	15	<330	<330	<330	<330	--
AOC14	AOC14-SS4	Soil	AOC14-SS-4-8087	10/2/2008	14	15	<330	<330	<330	<330	--
AOC1	AOC1-BCW1	Soil	AOC1-BCW1-100	9/20/2008	0	0.5	<330	<330	<330	<330	--
AOC1	AOC1-BCW1	Soil	AOC1-BCW1-101	9/20/2008	2	3	<330	<330	<330	<330	<5.2

Table A-2
Data for 2,4-Dimethylphenol, 4-Methylphenol,
Butyl Benzyl Phthalate, Dibenzofuran, and Methyl Acetate in Solid Matrices

Attachment 1 to Technical Memorandum 4
PG&E Topock
Needles, California

RFI Area	Location	Matrix	Sample ID	Sample Date	Top Depth (ft bgs)	Bottom Depth (ft bgs)	2,4-dimethylphenol (µg/kg)	4-methylphenol (µg/kg)	Butyl benzyl phthalate (µg/kg)	Dibenzofuran (µg/kg)	Methyl acetate (µg/kg)
AOC1	AOC1-BCW2	Soil	AOC1-BCW2-104	10/4/2008	0	0.5	<330	<330	<330	<330	--
AOC1	AOC1-BCW2	Soil	AOC1-BCW2-105	10/4/2008	2	3	<340	<340	<340	<340	--
AOC1	AOC1-BCW2	Soil	AOC1-BCW2-106	10/4/2008	5	6	<330	<330	<330	<330	--
AOC1	AOC1-BCW2	Soil	AOC1-BCW2-107	10/4/2008	9	10	<350	<350	<350	<350	--
AOC1	AOC1-BCW3	Soil	AOC1-BCW3-108	10/4/2008	0	0.5	<340	<340	<340	<340	--
AOC1	AOC1-BCW3	Soil	AOC1-BCW3-109	10/4/2008	2	3	<330	<330	<330	<330	--
AOC1	AOC1-BCW3	Soil	AOC1-BCW3-110	10/4/2008	5	6	<340	<340	<340	<340	--
AOC1	AOC1-BCW3	Soil	AOC1-BCW3-111	10/4/2008	9	10	<350	<350	<350	<350	--
AOC1	AOC1-BCW3	Soil	AOC1-BCW3-112	10/4/2008	9	10	<350	<350	<350	<350	--
AOC1	AOC1-BCW4	SOIL	AOC1-BCW4-113	10/4/2008	0	0.5	<340	<340	<340	<340	--
AOC1	AOC1-BCW4	Soil	AOC1-BCW4-114	10/4/2008	2	3	<330	<330	<330	<330	--
AOC1	AOC1-BCW4	Soil	AOC1-BCW4-115	10/4/2008	5	6	<340	<340	<340	<340	--
AOC1	AOC1-BCW4	Soil	AOC1-BCW4-116	10/4/2008	9	10	<350	<350	<350	<350	--
AOC1	AOC1-BCW5	Soil	AOC1-BCW5-117	10/4/2008	0	0.5	<330	<330	<330	<330	--
AOC1	AOC1-BCW5	Soil	AOC1-BCW5-118	10/4/2008	2	3	<330	<330	<330	<330	<5.2
AOC1	AOC1-BCW5	Soil	AOC1-BCW5-119	10/4/2008	5	6	<340	<340	<340	<340	--
AOC1	AOC1-BCW5	Soil	AOC1-BCW5-120	10/4/2008	9	10	<350	<350	<350	<350	--
AOC1	AOC1-BCW5	Soil	AOC1-BCW5-121	10/4/2008	9	10	<350	<350	<350	<350	--
AOC1	AOC1-BCW6	Sediment	AOC1-BCW6-122	8/22/2008	0	0.5	<470	<470	<470	<470	--
AOC1	AOC1-BCW6	Sediment	AOC1-BCW6-123	8/22/2008	2	3	<480	<480	<480	<480	<6.4
AOC1	AOC1-T1a	Soil	AOC1-T1a-001	10/16/2008	0	0.5	<330	<330	<330	<330	--
AOC1	AOC1-T1a	Soil	AOC1-T1a-002	10/16/2008	2	3	<330	<330	<330	<330	<7
AOC1	AOC1-T1a	Soil	AOC1-T1a-003	10/16/2008	5	6	<330	<330	<330	<330	--
AOC1	AOC1-T1a	Soil	AOC1-T1a-004	10/16/2008	9	10	<330	<330	<330	<330	--
AOC1	AOC1-T1b	Soil	AOC1-T1b-005	10/16/2008	0	0.5	<330	<330	<330	<330	--
AOC1	AOC1-T1b	Soil	AOC1-T1b-006	10/16/2008	0	0.5	<330	<330	<330	<330	--
AOC1	AOC1-T1b	Soil	AOC1-T1b-007	10/16/2008	2	3	<340	<340	<340	<340	<4.9
AOC1	AOC1-T1b	Soil	AOC1-T1b-008	10/16/2008	5	6	<330	<330	<330	<330	--
AOC1	AOC1-T1b	Soil	AOC1-T1b-009	10/16/2008	9	10	<330	<330	<330	<330	--
AOC1	AOC1-T1c	Soil	AOC1-T1c-010	10/16/2008	0	0.5	<340	<340	<340	<340	--
AOC1	AOC1-T1c	Soil	AOC1-T1c-011	10/16/2008	2	3	<340	<340	<340	<340	<5.2
AOC1	AOC1-T1c	Soil	AOC1-T1c-012	10/16/2008	2	3	<350	<350	<350	<350	<5
AOC1	AOC1-T1c	Soil	AOC1-T1c-013	10/16/2008	5	6	<340	<340	<340	<340	--
AOC1	AOC1-T1c	Soil	AOC1-T1c-014	10/16/2008	9	10	<340	<340	<340	<340	--
AOC1	AOC1-T2a	Soil	AOC1-T2a-015	10/5/2008	0	0.5	<330	<330	<330	<330	--
AOC1	AOC1-T2a	Soil	AOC1-T2a-016	10/16/2008	2	3	<330	<330	<330	<330	--
AOC1	AOC1-T2a	Soil	AOC1-T2a-017	10/16/2008	5	6	<330	<330	<330	<330	--
AOC1	AOC1-T2a	Soil	AOC1-T2a-018	10/16/2008	9	10	<340	<340	<340	<340	--
AOC1	AOC1-T2b	Soil	AOC1-T2b-019	10/16/2008	0	0.5	<340	<340	<340	<340	--
AOC1	AOC1-T2b	Soil	AOC1-T2b-020	10/16/2008	2	3	<340	<340	<340	<340	<5.2
AOC1	AOC1-T2b	Soil	AOC1-T2b-021	10/16/2008	5	6	<330	<330	<330	<330	--
AOC1	AOC1-T2b	Soil	AOC1-T2b-022	10/16/2008	9	10	<340	<340	<340	<340	--
AOC1	AOC1-T2b	Soil	AOC1-T2b-023	10/16/2008	9	10	<340	<340	<340	<340	--
AOC1	AOC1-T2c	Soil	AOC1-T2c-024	10/8/2008	0	0.5	<330	<330	<330	<330	--
AOC1	AOC1-T2c	Soil	AOC1-T2c-025	10/8/2008	2	3	<330	<330	<330	<330	--
AOC1	AOC1-T2c	Soil	AOC1-T2c-026	10/8/2008	5	6	<330	<330	<330	<330	--
AOC1	AOC1-T2c	Soil	AOC1-T2c-027	10/8/2008	9	10	<340	<340	<340	<340	--

Table A-2
Data for 2,4-Dimethylphenol, 4-Methylphenol,
Butyl Benzyl Phthalate, Dibenzofuran, and Methyl Acetate in Solid Matrices

Attachment 1 to Technical Memorandum 4
PG&E Topock
Needles, California

RFI Area	Location	Matrix	Sample ID	Sample Date	Top Depth (ft bgs)	Bottom Depth (ft bgs)	2,4-dimethylphenol (µg/kg)	4-methylphenol (µg/kg)	Butyl benzyl phthalate (µg/kg)	Dibenzofuran (µg/kg)	Methyl acetate (µg/kg)
AOC1	AOC1-T2d	Soil	AOC1-T2d-028	10/7/2008	0	0.5	<340	<340	<340	<340	--
AOC1	AOC1-T2d	Soil	AOC1-T2d-029	10/7/2008	2	3	<340	<340	<340	<340	--
AOC1	AOC1-T2d	Soil	AOC1-T2d-030	10/7/2008	5	6	<340	<340	<340	<340	--
AOC1	AOC1-T2d	Soil	AOC1-T2d-031	10/7/2008	9	10	<340	<340	<340	<340	--
AOC1	AOC1-T2d	Soil	AOC1-T2d-032	10/7/2008	19	20	<350	<350	<350	<350	--
AOC1	AOC1-T2d	Soil	AOC1-T2d-033	10/7/2008	29	30	<340	<340	<340	<340	--
AOC1	AOC1-T2d	Soil	AOC1-T2d-034	10/7/2008	29	30	<350	<350	<350	<350	--
AOC1	AOC1-T2d	Soil	AOC1-T2d-035	10/7/2008	39	40	<350	<350	<350	<350	--
AOC1	AOC1-T2d	Soil	AOC1-T2d-036	10/7/2008	49	50	<350	<350	<350	<350	--
AOC1	AOC1-T2d	Soil	AOC1-T2d-037	10/8/2008	59	60	<330	<330	<330	<330	--
AOC1	AOC1-T2d	Soil	AOC1-T2d-038	10/8/2008	69	70	<360	<360	<360	<360	--
AOC1	AOC1-T2e	Soil	AOC1-T2e-042	10/16/2008	0	0.5	<330	<330	<330	<330	--
AOC1	AOC1-T2e	Soil	AOC1-T2e-043	10/16/2008	2	3	<330	<330	<330	<330	--
AOC1	AOC1-T2e	Soil	AOC1-T2e-044	10/16/2008	2	3	<340	<340	<340	<340	--
AOC1	AOC1-T2e	Soil	AOC1-T2e-045	10/16/2008	5	6	<330	<330	<330	<330	--
AOC1	AOC1-T2e	Soil	AOC1-T2e-046	10/16/2008	9	10	<340	<340	<340	<340	--
AOC1	AOC1-T3a	Soil	AOC1-T3a-047	10/5/2008	0	0.5	<330	<330	<330	<330	--
AOC1	AOC1-T3a	Soil	AOC1-T3a-048	10/17/2008	2	3	<330	<330	<330	<330	6.6
AOC1	AOC1-T3a	Soil	AOC1-T3a-049	10/17/2008	5	6	<330	<330	<330	<330	--
AOC1	AOC1-T3a	Soil	AOC1-T3a-050	10/17/2008	9	10	<330	<330	<330	<330	--
AOC1	AOC1-T3b	Soil	AOC1-T3b-051	10/5/2008	0	0.5	<330	<330	<330	<330	--
AOC1	AOC1-T3b	Soil	AOC1-T3b-052	10/17/2008	2	3	<350	<350	<350	<350	--
AOC1	AOC1-T3b	Soil	AOC1-T3b-053	10/17/2008	5	6	<330	<330	<330	<330	--
AOC1	AOC1-T3b	Soil	AOC1-T3b-054	10/17/2008	9	10	<340	<340	<340	<340	--
AOC1	AOC1-T3b	Soil	AOC1-T3b-055	10/17/2008	9	10	<340	<340	<340	<340	--
AOC1	AOC1-T3c	Soil	AOC1-T3c-056	10/5/2008	0	0.5	<330	<330	<330	<330	--
AOC1	AOC1-T3c	Soil	AOC1-T3c-057	10/5/2008	2	3	<330	<330	<330	<330	--
AOC1	AOC1-T3c	Soil	AOC1-T3c-058	10/5/2008	5	6	<330	<330	<330	<330	--
AOC1	AOC1-T3c	Soil	AOC1-T3c-059	10/5/2008	9	10	<330	<330	<330	<330	--
AOC1	AOC1-T4a	Soil	AOC1-T4a-060	10/3/2008	0	0.5	<330	<330	<330	<330	--
AOC1	AOC1-T4a	Soil	AOC1-T4a-061	10/3/2008	2	3	<330	<330	<330	<330	--
AOC1	AOC1-T4a	Soil	AOC1-T4a-062	10/3/2008	5	6	<330	<330	<330	<330	--
AOC1	AOC1-T4a	Soil	AOC1-T4a-063	10/3/2008	9	10	<330	<330	<330	<330	--
AOC1	AOC1-T4b	Soil	AOC1-T4b-064	10/2/2008	0	0.5	<330	<330	<330	<330	--
AOC1	AOC1-T4b	Soil	AOC1-T4b-065	10/2/2008	2	3	<340	<340	<340	<340	--
AOC1	AOC1-T4b	Soil	AOC1-T4b-066	10/2/2008	2	3	<340	<340	<340	<340	--
AOC1	AOC1-T4b	Soil	AOC1-T4b-067	10/2/2008	5	6	<340	<340	<340	<340	--
AOC1	AOC1-T4b	Soil	AOC1-T4b-068	10/2/2008	9	10	<340	<340	<340	<340	--
AOC1	AOC1-T4c	Soil	AOC1-T4c-069	10/4/2008	0	0.5	<330	<330	<330	<330	--
AOC1	AOC1-T4c	Soil	AOC1-T4c-070	10/4/2008	2	3	<340	<340	<340	<340	<6.9
AOC1	AOC1-T4c	Soil	AOC1-T4c-071	10/4/2008	5	6	<340	<340	<340	<340	--
AOC1	AOC1-T4c	Soil	AOC1-T4c-072	10/4/2008	9	10	<340	<340	<340	<340	--
AOC1	AOC1-T5a	Soil	AOC1-T5a-073	10/4/2008	0	0.5	<330	<330	<330	<330	--
AOC1	AOC1-T5a	Soil	AOC1-T5a-074	10/4/2008	2	3	<330	<330	<330	<330	--
AOC1	AOC1-T5a	Soil	AOC1-T5a-075	10/4/2008	5	6	<330	<330	<330	<330	--
AOC1	AOC1-T5a	Soil	AOC1-T5a-076	10/4/2008	9	10	<340	<340	<340	<340	--
AOC1	AOC1-T5a	Soil	AOC1-T5a-077	10/4/2008	9	10	<340	<340	<340	<340	--

Table A-2
Data for 2,4-Dimethylphenol, 4-Methylphenol,
Butyl Benzyl Phthalate, Dibenzofuran, and Methyl Acetate in Solid Matrices

Attachment 1 to Technical Memorandum 4
PG&E Topock
Needles, California

RFI Area	Location	Matrix	Sample ID	Sample Date	Top Depth (ft bgs)	Bottom Depth (ft bgs)	2,4-dimethylphenol (µg/kg)	4-methylphenol (µg/kg)	Butyl benzyl phthalate (µg/kg)	Dibenzofuran (µg/kg)	Methyl acetate (µg/kg)
AOC1	AOC1-T5b	Soil	AOC1-T5b-078	10/4/2008	0	0.5	<330	<330	<330	<330	--
AOC1	AOC1-T5b	Soil	AOC1-T5b-079	10/4/2008	2	3	<340	<340	<340	<340	<7.4
AOC1	AOC1-T5b	Soil	AOC1-T5b-080	10/4/2008	5	6	<330	<330	<330	<330	--
AOC1	AOC1-T5b	Soil	AOC1-T5b-081	10/4/2008	9	10	<340	<340	<340	<340	--
AOC1	AOC1-T5c	Soil	AOC1-T5c-082	10/4/2008	0	0.5	<330	<330	<330	<330	--
AOC1	AOC1-T5c	Soil	AOC1-T5c-083	10/4/2008	2	3	<330	<330	<330	<330	--
AOC1	AOC1-T5c	Soil	AOC1-T5c-084	10/4/2008	5	6	<330	<330	<330	<330	--
AOC1	AOC1-T5c	Soil	AOC1-T5c-085	10/4/2008	9	10	<330	<330	<330	<330	--
AOC1	AOC1-T6a	Soil	AOC1-T6a-086	9/30/2008	0	0.5	<330	<330	<330	<330	--
AOC1	AOC1-T6a	Soil	AOC1-T6a-087	9/30/2008	2.5	3	<340	<340	<340	<340	--
AOC1	AOC1-T6a	Soil	AOC1-T6a-088	9/30/2008	2.5	3	<340	<340	<340	<340	--
AOC1	AOC1-T6a	Soil	AOC1-T6a-089	9/30/2008	5.5	6	<340	<340	<340	<340	--
AOC1	AOC1-T6a	Soil	AOC1-T6a-090	9/30/2008	9.5	10	<340	<340	<340	<340	--
AOC1	AOC1-T6b	Soil	AOC1-T6b-091	9/30/2008	0	0.5	<330	<330	<330	<330	--
AOC1	AOC1-T6b	Soil	AOC1-T6b-092	9/30/2008	2.5	3	<330	<330	<330	<330	--
AOC1	AOC1-T6b	Soil	AOC1-T6b-093	9/30/2008	5.5	6	<330	<330	<330	<330	--
AOC1	AOC1-T6b	Soil	AOC1-T6b-094	9/30/2008	9.5	10	<330	<330	<330	<330	--
AOC1	AOC1-T6b	Soil	AOC1-T6b-099	9/30/2008	9.5	10	<330	<330	<330	<330	--
AOC1	AOC1-T6c	Soil	AOC1-T6c-095	9/30/2008	0	0.5	<330	<330	<330	<330	--
AOC1	AOC1-T6c	Soil	AOC1-T6c-096	9/30/2008	2.5	3	<330	<330	<330	<330	<5
AOC1	AOC1-T6c	Soil	AOC1-T6c-097	9/30/2008	5.5	6	<330	<330	<330	<330	--
AOC4	AOC4-10	Soil	AOC4-10-3030R	10/3/2008	0	0.5	<330	<330	<330	<330	--
AOC4	AOC4-T3a	Soil	AOC4-11041	10/23/2008	2.5	3	<1700	<1700	<1700	<1700	--
AOC4	AOC4-11	Soil	AOC4-11-3034R	10/3/2008	0	0.5	<330	<330	<330	<330	--
AOC4	AOC4-12A	Soil	AOC4-12-3037	8/24/2008	0	0.5	<330	<330	<330	<330	--
AOC4	AOC4-12	Soil	AOC4-12-3037R	10/3/2008	0	0.5	<330 J	<330 J	<330 J	<330 J	--
AOC4	AOC4-12	Soil	AOC4-12-3038R	10/3/2008	0.5	1	<330 J	<330 J	<330 J	<330 J	--
AOC4	AOC4-1	Soil	AOC4-1-3001	10/14/2008	0	0.5	<330	<330	<330	<330	--
AOC4	AOC4-1	Soil	AOC4-1-3002	10/14/2008	0.5	1	<330	<330	<330	<330	--
AOC4	AOC4-1	Soil	AOC4-1-3003	10/14/2008	2	3	<330	<330	<330	<330	12
AOC4	AOC4-13	Soil	AOC4-13-3040	8/24/2008	0	0.5	<1700	<1700	<1700	<1700	--
AOC4	AOC4-14	Soil	AOC4-14-3043	8/24/2008	0	0.5	<330	<330	<330	<330	--
AOC4	AOC4-14	Soil	AOC4-14-3044	8/24/2008	0	0.5	<330	<330	<330	<330	--
AOC4	AOC4-15	Soil	AOC4-15-3047	9/19/2008	0	0.5	<330	<330	<330	<330	--
AOC4	AOC4-15	Soil	AOC4-15-3048	9/19/2008	0.5	1	<330	<330	<330	<330	--
AOC4	AOC4-15	Soil	AOC4-15-3049	9/19/2008	2	3	<340	<340	<340	<340	--
AOC4	AOC4-2	Soil	AOC4-2-3004	10/3/2008	0	0.5	<330	<330	<330	<330	--
AOC4	AOC4-2	Soil	AOC4-2-3005	10/3/2008	0.5	1	<330	<330	<330	<330	--
AOC4	AOC4-3	Soil	AOC4-3-3007	8/24/2008	0	0.5	<330	<330	<330	<330	--
AOC4	AOC4-3	Soil	AOC4-3-3008	8/24/2008	0.5	1	<330	<330	<330	<330	--
AOC4	AOC4-4	Soil	AOC4-4-3010	8/24/2008	0	0.5	<330	<330	<330	<330	--
AOC4	AOC4-4	Soil	AOC4-4-3011	8/24/2008	0	0.5	<330	<330	<330	<330	--
AOC4	AOC4-5	Soil	AOC4-5-3014R	10/3/2008	0	0.5	<330	<330	<330	<330	--
AOC4	AOC4-6	Soil	AOC4-6-3017	8/24/2008	0	0.5	<330	<330	<330	<330	--
AOC4	AOC4-6	Soil	AOC4-6-3018	8/24/2008	0.5	1	<330	<330	<330	<330	--
AOC4	AOC4-6	Soil	AOC4-6-3019	10/3/2008	2	3	<340	<340	<340	<340	--
AOC4	AOC4-7	Soil	AOC4-7-3020	10/3/2008	0	0.5	<330	<330	<330	<330	--

Table A-2
Data for 2,4-Dimethylphenol, 4-Methylphenol,
Butyl Benzyl Phthalate, Dibenzofuran, and Methyl Acetate in Solid Matrices

Attachment 1 to Technical Memorandum 4
PG&E Topock
Needles, California

RFI Area	Location	Matrix	Sample ID	Sample Date	Top Depth (ft bgs)	Bottom Depth (ft bgs)	2,4-dimethylphenol (µg/kg)	4-methylphenol (µg/kg)	Butyl benzyl phthalate (µg/kg)	Dibenzofuran (µg/kg)	Methyl acetate (µg/kg)
AOC4	AOC4-8	Soil	AOC4-8-3024R	10/3/2008	0	0.5	<330	<330	<330	<330	--
AOC4	AOC4-9	Soil	AOC4-9-3027	8/24/2008	0	0.5	<330	<330	<330	<330	--
AOC4	AOC4-B10	Soil	AOC4-B10-11005	10/5/2008	0	0.5	<330 J	<330 J	<330 J	<330 J	--
AOC4	AOC4-B20	Soil	AOC4-B20-11006	10/5/2008	0	0.5	<340 J	<340 J	<340 J	<340 J	--
AOC4	AOC4-B30	Soil	AOC4-B30-11007	10/5/2008	0	0.5	<450 J	<450 J	<450 J	<450 J	--
AOC4	AOC4-D10	Soil	AOC4-D10-11013	10/5/2008	0	0.5	<1800 J	<1800 J	<1800 J	<1800 J	--
AOC4	AOC4-D20	Soil	AOC4-D20-11014	10/5/2008	0	0.5	<360 J	<360 J	<360 J	<360 J	--
AOC4	AOC4-D30	WhitePowder	AOC4-D30-11015	10/5/2008	0	0.5	<850 J	<850 J	<850 J	<850 J	--
AOC4	AOC4-DE5	Soil	AOC4-DE5-11002	10/5/2008	0	0.5	<370 J	<370 J	<370 J	<370 J	--
AOC4	AOC4-GH10	Soil	AOC4-GH10-11029	10/5/2008	0	0.5	<360 J	<360 J	<360 J	<360 J	--
AOC4	AOC4-GH30	Soil	AOC4-GH30-11031	10/5/2008	0	0.5	<360 J	<360 J	<360 J	<360 J	--
AOC4	AOC4-I20	Soil	AOC4-I20-11038	10/5/2008	0	0.5	<350 J	<350 J	<350 J	<350 J	--
AOC4	AOC4-I30	Soil	AOC4-I30-11039	10/5/2008	0	0.5	<360 J	<360 J	<360 J	<360 J	--
AOC4	AOC4-SS1	Soil	AOC4-SS-1-3088R	9/19/2008	0	0.5	<330	<330	<330	<330	--
AOC4	AOC4-SS2	Soil	AOC4-SS-2-3089R	10/3/2008	0	0.5	<830	<830	<830	<830	--
AOC4	AOC4-SS3	Soil	AOC4-SS-3-3090R	10/3/2008	0	0.5	<830	<830	<830	<830	--
AOC4	AOC4-T1a	Soil	AOC4-T-12000	10/22/2008	0	0.5	<340	<340	<340	<340	--
AOC4	AOC4-T1a	Soil	AOC4-T-12001	10/22/2008	3.5	4	<360	<360	<360	<360	--
AOC4	AOC4-T2a	Soil	AOC4-T-12002	10/22/2008	3.5	4	<380	<380	<380	<380	--
AOC4	AOC4-T2b	Soil	AOC4-T-12003	10/22/2008	7.5	8	<360	<360	<360	<360	--
AOC4	AOC4-T2b	Soil	AOC4-T-12004	10/22/2008	2.5	3	<340	<340	<340	<340	--
AOC4	AOC4-T2c	Soil	AOC4-T-12005	10/22/2008	2.5	3	<350	<350	<350	<350	--
AOC4	AOC4-T2c	Soil	AOC4-T-12006	10/22/2008	0	0.5	<360	<360	<360	<360	--
AOC4	AOC4-T3a	Soil	AOC4-T-12007	10/23/2008	2.5	3	<1700	<1700	<1700	<1700	--
AOC4	AOC4-T3b	Soil	AOC4-T-12008	10/23/2008	2.5	3	<340	<340	<340	<340	--
AOC4	AOC4-T3c	Soil	AOC4-T-12009	10/23/2008	2.5	3	<340	<340	<340	<340	--
AOC4	AOC4-T4a	Soil	AOC4-T-12010	10/23/2008	2.5	3	<330	<330	<330	<330	<6.2
AOC4	AOC4-T4b	Soil	AOC4-T-12011	10/23/2008	2.5	3	<340	<340	<340	<340	--
AOC4	AOC4-T4c	Soil	AOC4-T-12012	10/23/2008	2.5	3	<340	<340	<340	<340	--
AOC4	AOC4-Stained	Soil	AOC4-T5a-3068	10/4/2008	0	0.5	<330	<330	<330	<330	--
AOC4	AOC4-Wood1	Wood	AOC4-Wood1-3070R	10/3/2008	0	0	<340	<340	<340	<340	--
AOC4	AOC4-Wood2	Wood	AOC4-Wood2-3071R	10/3/2008	0	0	<350	<350	<350	<350	--
AOC4	AOC4-Z25	Soil	AOC4-Z25-11001	10/5/2008	0	0.5	<340 J	<340 J	<340 J	<340 J	--
AOC9	AOC9-10	Soil	AOC9-10-4023	10/1/2008	0	0.5	<330	<330	<330	<330	--
AOC9	AOC9-10	Soil	AOC9-10-4024	10/1/2008	2	3	<330	<330	<330	<330	--
AOC9	AOC9-11	Soil	AOC9-11-4025	9/18/2008	0	0.5	<350	<350	<350	<350	--
AOC9	AOC9-11	Soil	AOC9-11-4026	9/18/2008	2	3	<330	<330	<330	<330	<6.3
AOC9	AOC9-12	Soil	AOC9-12-4027	10/1/2008	0	0.5	<340	<340	<340	<340	--
AOC9	AOC9-12	Soil	AOC9-12-4028	10/1/2008	2	3	<340	<340	<340	<340	<5.9
AOC9	AOC9-13	Soil	AOC9-13-4029	9/19/2008	0	0.5	<330	<330	<330	<330	--
AOC9	AOC9-13	Soil	AOC9-13-4030	9/19/2008	2	3	<340	<340	<340	<340	--
AOC9	AOC9-13	Soil	AOC9-13-4031	9/19/2008	2	3	<340	<340	<340	<340	--
AOC9	AOC9-1	Soil	AOC9-1-4001	10/1/2008	0	0.5	<330	<330	<330	<330	--
AOC9	AOC9-1	Soil	AOC9-1-4002	10/1/2008	2	3	<340	<340	<340	<340	--
AOC9	AOC9-14	whitepowder	AOC9-14-4032	10/2/2008	0	0.5	<360	<360	<360	<360	--
AOC9	AOC9-14	Soil	AOC9-14-4033	10/2/2008	2	3	<340	<340	<340	<340	--

Table A-2
Data for 2,4-Dimethylphenol, 4-Methylphenol,
Butyl Benzyl Phthalate, Dibenzofuran, and Methyl Acetate in Solid Matrices

Attachment 1 to Technical Memorandum 4
PG&E Topock
Needles, California

RFI Area	Location	Matrix	Sample ID	Sample Date	Top Depth (ft bgs)	Bottom Depth (ft bgs)	2,4-dimethylphenol (µg/kg)	4-methylphenol (µg/kg)	Butyl benzyl phthalate (µg/kg)	Dibenzofuran (µg/kg)	Methyl acetate (µg/kg)
AOC9	AOC9-2	Soil	AOC9-2-4003	9/18/2008	0	0.5	<330	<330	<330	<330	--
AOC9	AOC9-2	Soil	AOC9-2-4004	9/18/2008	2	3	<330	<330	<330	<330	--
AOC9	AOC9-3	Soil	AOC9-3-4005	9/18/2008	0	0.5	<330	<330	<330	<330	--
AOC9	AOC9-3	Soil	AOC9-3-4006	9/18/2008	2	3	<340	<340	<340	<340	--
AOC9	AOC9-4	Soil	AOC9-4-4007	9/18/2008	0	0.5	<330	<330	<330	<330	--
AOC9	AOC9-4	Soil	AOC9-4-4008	9/18/2008	2	3	<330	<330	<330	<330	--
AOC9	AOC9-5	Soil	AOC9-5-4009	10/1/2008	0	0.5	<330	<330	<330	<330	--
AOC9	AOC9-5	Soil	AOC9-5-4010	10/1/2008	2	3	<330	<330	<330	<330	<5.3
AOC9	AOC9-5	Soil	AOC9-5-4011	10/1/2008	2	3	<330	<330	<330	<330	<4.3
AOC9	AOC9-6	Soil	AOC9-6-4012	9/18/2008	0	0.5	<830	<830	<830	<830	--
AOC9	AOC9-6	Soil	AOC9-6-4013	9/18/2008	2	3	<340	<340	<340	<340	--
AOC9	AOC9-7	Soil	AOC9-7-4014	9/18/2008	0	0.5	<330	<330	<330	<330	--
AOC9	AOC9-7	Soil	AOC9-7-4015	9/18/2008	2	3	<330	<330	<330	<330	--
AOC9	AOC9-8	Soil	AOC9-8-4016	10/1/2008	0	0.5	<330	<330	<330	<330	--
AOC9	AOC9-8	Soil	AOC9-8-4017	10/1/2008	2.5	3	<340	<340	<340	<340	--
AOC9	AOC9-8	Soil	AOC9-8-4018	10/1/2008	5.5	6	<340	<340	<340	<340	--
AOC9	AOC9-9	Soil	AOC9-9-4019	10/1/2008	0	0.5	<330	<330	<330	<330	--
AOC9	AOC9-9	Soil	AOC9-9-4020	10/1/2008	2.5	3	<340	<340	<340	<340	--
AOC9	AOC9-9	Soil	AOC9-9-4021	10/1/2008	5.5	6	<340	<340	<340	<340	--
AOC9	AOC9-9	Soil	AOC9-9-4022	10/1/2008	5.5	6	<340	<340	<340	<340	--
AOC4	DR-1	Soil	DR-1-D	4/24/1997	0.5	1	<330	<330	<330	<330	--
AOC4	DR-1	Soil	DR-1-S	4/24/1997	0	0.5	<330	<330	<330	<330	--
AOC4	DR-2	Soil	DR-2-S	4/24/1997	0	0.5	<330	<330	<330	<330	--
AOC4	DR-3	Soil	DR-3-D	4/24/1997	0.5	1	<330	<330	<330	<330	--
AOC4	DR-3	Soil	DR-3-S	4/24/1997	0	0.5	<330	<330	<330	<330	--
AOC4	DR-4	Soil	DR-4-S	4/24/1997	0	0.5	<340	<340	60 J	<340	--
AOC4	DR-5	Soil	DR-5-D	4/24/1997	0.5	1	<350	<350	<350	<350	--
AOC4	DR-5	Soil	DR-5-S	4/24/1997	0	0.5	<340	<340	<340	<340	--
AOC4	DR-6	Soil	DR-6-D	4/24/1997	0.5	1	44 J	<350	<350	<350	--
AOC4	DR-6	Soil	DR-6-S	4/24/1997	0	0.5	<330	<330	<330	53 J	--
AOC4	DR-7	Soil	DR-7-D	4/24/1997	0.5	1	<380	<380	<380	<380	--
AOC4	DR-7	Soil	DR-7-S	4/24/1997	0	0.5	<330	<330	<330	<330	--
AOC14	S2-62	Soil	S2-62-3	11/1/1998	3	3	<550	--	<550	<550	--
AOC14	S8-23	Soil	S8-23-3	11/1/1998	3	3	<21000	--	<21000	<21000	--
SWMU1	SWMU1-10	Soil	SWMU1-10-1053	10/14/2008	0	0.5	<330	<330	<330	<330	--
SWMU1	SWMU1-10	Soil	SWMU1-10-1054	10/14/2008	2	3	<330	<330	<330	<330	--
SWMU1	SWMU1-10	Soil	SWMU1-10-1055	10/14/2008	5	6	<340	<340	<340	<340	--
SWMU1	SWMU1-10	Soil	SWMU1-10-1056	10/14/2008	5	6	<340	<340	<340	<340	--
SWMU1	SWMU1-10	Soil	SWMU1-10-1057	10/14/2008	9	10	<350	<350	<350	<350	--
SWMU1	SWMU1-1	Soil	SWMU1-1-1001	10/16/2008	0	0.5	<400	<400	<400	<400	--
SWMU1	SWMU1-1	Soil	SWMU1-1-1002	10/16/2008	2	3	<340	<340	<340	<340	<5.3
SWMU1	SWMU1-1	Soil	SWMU1-1-1003	10/16/2008	5	6	<350	<350	<350	<350	--
SWMU1	SWMU1-1	Soil	SWMU1-1-1004	10/16/2008	9	10	<340	<340	<340	<340	--
SWMU1	SWMU1-11	Soil	SWMU1-11-1058	10/15/2008	0	0.5	<350	<350	<350	<350	--
SWMU1	SWMU1-11	Soil	SWMU1-11-1059	10/15/2008	2	3	<350	<350	<350	<350	<19
SWMU1	SWMU1-11	Soil	SWMU1-11-1060	10/15/2008	5	6	<350	<350	<350	<350	--
SWMU1	SWMU1-11	Soil	SWMU1-11-1061	10/15/2008	9	10	<350	<350	<350	<350	--

Table A-2
Data for 2,4-Dimethylphenol, 4-Methylphenol,
Butyl Benzyl Phthalate, Dibenzofuran, and Methyl Acetate in Solid Matrices

Attachment 1 to Technical Memorandum 4
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Needles, California

RFI Area	Location	Matrix	Sample ID	Sample Date	Top Depth (ft bgs)	Bottom Depth (ft bgs)	2,4-dimethylphenol (µg/kg)	4-methylphenol (µg/kg)	Butyl benzyl phthalate (µg/kg)	Dibenzofuran (µg/kg)	Methyl acetate (µg/kg)
SWMU1	SWMU1-12	Soil	SWMU1-12-1062	10/14/2008	0	0.5	<330	<330	<330	<330	--
SWMU1	SWMU1-12	Soil	SWMU1-12-1063	10/14/2008	2	3	<330	<330	<330	<330	--
SWMU1	SWMU1-12	Soil	SWMU1-12-1064	10/14/2008	5	6	<340	<340	<340	<340	--
SWMU1	SWMU1-12	Soil	SWMU1-12-1065	10/14/2008	9	10	<340	<340	<340	<340	--
SWMU1	SWMU1-13	Soil	SWMU1-13-1066	10/14/2008	0	0.5	<330	<330	<330	<330	--
SWMU1	SWMU1-13	Soil	SWMU1-13-1067	10/14/2008	2	3	<340	<340	<340	<340	<6
SWMU1	SWMU1-13	Soil	SWMU1-13-1068	10/14/2008	2	3	<340	<340	<340	<340	<5.8
SWMU1	SWMU1-13	Soil	SWMU1-13-1069	10/14/2008	5	6	<340	<340	<340	<340	--
SWMU1	SWMU1-13	Soil	SWMU1-13-1070	10/14/2008	9	10	<350	<350	<350	<350	--
SWMU1	SWMU1-14	Soil	SWMU1-14-1071	10/14/2008	0	0.5	<330	<330	<330	<330	--
SWMU1	SWMU1-14	Soil	SWMU1-14-1072	10/14/2008	2	3	<340	<340	<340	<340	--
SWMU1	SWMU1-14	Soil	SWMU1-14-1073	10/14/2008	5	6	<340	<340	<340	<340	--
SWMU1	SWMU1-14	Soil	SWMU1-14-1074	10/14/2008	9	10	<340	<340	<340	<340	--
SWMU1	SWMU1-15	Soil	SWMU1-15-1075	9/22/2008	0	0.5	<340	<340	<340	<340	--
SWMU1	SWMU1-15	Soil	SWMU1-15-1076	9/22/2008	2	3	<350	<350	<350	<350	<6.4
SWMU1	SWMU1-15	Soil	SWMU1-15-1077	9/22/2008	5	6	<350	<350	<350	<350	--
SWMU1	SWMU1-15	Soil	SWMU1-15-1078	9/22/2008	9	10	<340	<340	<340	<340	--
SWMU1	SWMU1-15	Soil	SWMU1-15-1079	9/22/2008	9	10	<340	<340	<340	<340	--
SWMU1	SWMU1-15	Soil	SWMU1-15-1080	9/22/2008	19	20	<350	<350	<350	<350	--
SWMU1	SWMU1-15	Soil	SWMU1-15-1081	9/22/2008	29	30	<350	<350	<350	<350	--
SWMU1	SWMU1-15	Soil	SWMU1-15-1082	9/22/2008	39	40	<340	<340	<340	<340	--
SWMU1	SWMU1-15	Soil	SWMU1-15-1083	9/22/2008	49	50	<360	<360	<360	<360	--
SWMU1	SWMU1-15	Soil	SWMU1-15-1084	9/22/2008	59	60	<350	<350	<350	<350	--
SWMU1	SWMU1-15	Soil	SWMU1-15-1085	9/22/2008	69	70	<350	<350	<350	<350	--
SWMU1	SWMU1-15	Soil	SWMU1-15-1086	9/22/2008	79	80	<350	<350	<350	<350	--
SWMU1	SWMU1-15	Soil	SWMU1-15-1087	9/23/2008	89	90	<330	<330	<330	<330	--
SWMU1	SWMU1-15	Soil	SWMU1-15-1089	9/22/2008	59	60	<350	<350	<350	<350	--
SWMU1	SWMU1-16	Soil	SWMU1-16-1090	9/21/2008	0	0.5	<330	<330	<330	<330	--
SWMU1	SWMU1-16	Soil	SWMU1-16-1091	9/21/2008	2	3	<340	<340	<340	<340	--
SWMU1	SWMU1-16	Soil	SWMU1-16-1092	9/21/2008	5	6	<330	<330	<330	<330	--
SWMU1	SWMU1-17	Soil	SWMU1-17-1094	9/21/2008	0	0.5	<330	<330	<330	<330	--
SWMU1	SWMU1-17	Soil	SWMU1-17-1095	9/21/2008	2	3	<330	<330	<330	<330	<7
SWMU1	SWMU1-17	Soil	SWMU1-17-1096	9/21/2008	5	6	<330	<330	<330	<330	--
SWMU1	SWMU1-17	Soil	SWMU1-17-1097	9/21/2008	9	10	<330	<330	<330	<330	--
SWMU1	SWMU1-17	Soil	SWMU1-17-1098	9/21/2008	9	10	<330	<330	<330	<330	--
SWMU1	SWMU1-2	Soil	SWMU1-2-1005	10/15/2008	0	0.5	<330	<330	<330	<330	--
SWMU1	SWMU1-2	Soil	SWMU1-2-1006	10/15/2008	2	3	<330	<330	<330	<330	--
SWMU1	SWMU1-2	Soil	SWMU1-2-1007	10/15/2008	5	6	<330	<330	<330	<330	--
SWMU1	SWMU1-2	Soil	SWMU1-2-1008	10/15/2008	9	10	<340	<340	<340	<340	--
SWMU1	SWMU1-3	Soil	SWMU1-3-1009	10/6/2008	0	0.5	<330	<330	<330	<330	--
SWMU1	SWMU1-3	Soil	SWMU1-3-1010	10/6/2008	2	3	<340	<340	<340	<340	<7.7
SWMU1	SWMU1-3	Soil	SWMU1-3-1011	10/6/2008	2	3	<340	<340	<340	<340	<4.5
SWMU1	SWMU1-3	Soil	SWMU1-3-1012	10/6/2008	5	6	<340	<340	<340	<340	--
SWMU1	SWMU1-3	Soil	SWMU1-3-1013	10/6/2008	9	10	<350	<350	<350	<350	--
SWMU1	SWMU1-3	Soil	SWMU1-3-1014	10/6/2008	19	20	<340	<340	<340	<340	--
SWMU1	SWMU1-3	Soil	SWMU1-3-1015	10/6/2008	29	30	<350	<350	<350	<350	--
SWMU1	SWMU1-3	Soil	SWMU1-3-1016	10/6/2008	39	40	<350	<350	<350	<350	--

Table A-2
Data for 2,4-Dimethylphenol, 4-Methylphenol,
Butyl Benzyl Phthalate, Dibenzofuran, and Methyl Acetate in Solid Matrices

Attachment 1 to Technical Memorandum 4
PG&E Topock
Needles, California

RFI Area	Location	Matrix	Sample ID	Sample Date	Top Depth (ft bgs)	Bottom Depth (ft bgs)	2,4-dimethylphenol (µg/kg)	4-methylphenol (µg/kg)	Butyl benzyl phthalate (µg/kg)	Dibenzofuran (µg/kg)	Methyl acetate (µg/kg)
SWMU1	SWMU1-3	Soil	SWMU1-3-1017	10/6/2008	49	50	<350	<350	<350	<350	--
SWMU1	SWMU1-3	Soil	SWMU1-3-1018	10/6/2008	59	60	<340	<340	<340	<340	--
SWMU1	SWMU1-3	Soil	SWMU1-3-1019	10/7/2008	69	70	<350	<350	<350	<350	--
SWMU1	SWMU1-3	Soil	SWMU1-3-1020	10/7/2008	79	80	<370	<370	<370	<370	--
SWMU1	SWMU1-3	Soil	SWMU1-3-1022	10/7/2008	79	80	<380	<380	<380	<380	--
SWMU1	SWMU1-4	Soil	SWMU1-4-1025	10/15/2008	0	0.5	<330	<330	<330	<330	--
SWMU1	SWMU1-4	Soil	SWMU1-4-1026	10/15/2008	2	3	<340	<340	<340	<340	<5.3
SWMU1	SWMU1-4	Soil	SWMU1-4-1027	10/15/2008	5	6	<340	<340	<340	<340	--
SWMU1	SWMU1-4	Soil	SWMU1-4-1028	10/15/2008	7	8	<340	<340	<340	<340	--
SWMU1	SWMU1-4	Soil	SWMU1-4-1029	10/15/2008	9	10	<340	<340	<340	<340	--
SWMU1	SWMU1-4	Soil	SWMU1-4-1030	10/15/2008	13	14	<340	<340	<340	<340	--
SWMU1	SWMU1-5	Soil	SWMU1-5-1031	10/15/2008	9	10	<340	<340	<340	<340	--
SWMU1	SWMU1-5	Soil	SWMU1-5-1032	10/15/2008	13	14	<350	<350	<350	<350	--
SWMU1	SWMU1-5	Soil	SWMU1-5-1033	10/15/2008	13	14	<350	<350	<350	<350	--
SWMU1	SWMU1-5	Soil	SWMU1-5-1034	10/15/2008	15	16	<340	<340	<340	<340	--
SWMU1	SWMU1-5	Soil	SWMU1-5-1035	10/15/2008	19	20	<350	<350	<350	<350	--
SWMU1	SWMU1-6	Soil	SWMU1-6-1036	10/15/2008	0	0.5	<330	<330	<330	<330	--
SWMU1	SWMU1-6	Soil	SWMU1-6-1037	10/15/2008	2	3	<330	<330	<330	<330	--
SWMU1	SWMU1-6	Soil	SWMU1-6-1038	10/15/2008	5	6	<330	<330	<330	<330	--
SWMU1	SWMU1-6	Soil	SWMU1-6-1039	10/15/2008	9	10	<330	<330	<330	<330	--
SWMU1	SWMU1-7	Soil	SWMU1-7-1040	10/15/2008	0	0.5	<330	<330	<330	<330	--
SWMU1	SWMU1-7	Soil	SWMU1-7-1041	10/15/2008	2	3	<340	<340	<340	<340	--
SWMU1	SWMU1-7	Soil	SWMU1-7-1042	10/15/2008	5	6	<340	<340	<340	<340	--
SWMU1	SWMU1-7	Soil	SWMU1-7-1043	10/15/2008	9	10	<340	<340	<340	<340	--
SWMU1	SWMU1-7	Soil	SWMU1-7-1044	10/15/2008	9	10	<340	<340	<340	<340	--
SWMU1	SWMU1-8	Soil	SWMU1-8-1045	10/15/2008	0	0.5	<340	<340	<340	<340	--
SWMU1	SWMU1-8	Soil	SWMU1-8-1046	10/15/2008	2	3	<350	<350	<350	<350	--
SWMU1	SWMU1-8	Soil	SWMU1-8-1047	10/15/2008	5	6	<340	<340	<340	<340	--
SWMU1	SWMU1-8	Soil	SWMU1-8-1048	10/15/2008	9	10	<360	<360	<360	<360	--
SWMU1	SWMU1-9	Soil	SWMU1-9-1049	10/14/2008	0	0.5	<340	<340	<340	<340	--
SWMU1	SWMU1-9	Soil	SWMU1-9-1050	10/14/2008	2	3	<1700	<1700	<1700	<1700	<6.2
SWMU1	SWMU1-9	Soil	SWMU1-9-1051	10/14/2008	5	6	<340	<340	<340	<340	--
SWMU1	SWMU1-9	Soil	SWMU1-9-1052	10/14/2008	9	10	<350	<350	<350	<350	--
SWMU1	SWMU1-WP-10	Soil	SWMU1-WP10-2068	10/5/2008	0	0.5	<340	<340	<340	<340	--
SWMU1	SWMU1-WP-10	WhitePowder	SWMU1-WP10-2069	10/5/2008	2	3	<350	<350	<350	<350	--
SWMU1	SWMU1-WP-10	Soil	SWMU1-WP10-2070	10/5/2008	5	6	<350	<350	<350	<350	--
SWMU1	SWMU1-WP-10	Soil	SWMU1-WP10-2073	10/5/2008	9	10	<350	<350	<350	<350	--
SWMU1	SWMU1-WP-1h	Soil	SWMU1-WP-1h-2001	10/7/2008	0	0.5	<340	<340	<340	<340	--
SWMU1	SWMU1-WP-1h	Soil	SWMU1-WP-1h-2002	10/7/2008	2	3	<340	<340	<340	<340	<7.7
SWMU1	SWMU1-WP-1h	Soil	SWMU1-WP-1h-2003	10/7/2008	5	6	<350	<350	<350	<350	--
SWMU1	SWMU1-WP-1h	Soil	SWMU1-WP-1h-2005	10/7/2008	9	10	<350	<350	<350	<350	--
SWMU1	SWMU1-WP-3a	Soil	SWMU1-WP-3a-2006	10/14/2008	0	0.5	<350	<350	<350	<350	--
SWMU1	SWMU1-WP-3a	Soil	SWMU1-WP-3a-2007	10/14/2008	2	3	<350	<350	<350	<350	<4.6
SWMU1	SWMU1-WP-3a	Soil	SWMU1-WP-3a-2008	10/14/2008	5	6	<350	<350	<350	<350	--
SWMU1	SWMU1-WP-3a	Soil	SWMU1-WP-3a-2009	10/14/2008	7	8	<340	<340	<340	<340	--
SWMU1	SWMU1-WP-3a	Soil	SWMU1-WP-3a-2010	10/14/2008	9	10	<340	<340	<340	<340	--
SWMU1	SWMU1-WP-3a	Soil	SWMU1-WP-3a-2011	10/14/2008	9	10	<340	<340	<340	<340	--

Table A-2
Data for 2,4-Dimethylphenol, 4-Methylphenol,
Butyl Benzyl Phthalate, Dibenzofuran, and Methyl Acetate in Solid Matrices

Attachment 1 to Technical Memorandum 4
PG&E Topock
Needles, California

RFI Area	Location	Matrix	Sample ID	Sample Date	Top Depth (ft bgs)	Bottom Depth (ft bgs)	2,4-dimethylphenol (µg/kg)	4-methylphenol (µg/kg)	Butyl benzyl phthalate (µg/kg)	Dibenzofuran (µg/kg)	Methyl acetate (µg/kg)
SWMU1	SWMU1-WP-3a	Soil	SWMU1-WP-3a-2012	10/14/2008	11	12	<350	<350	<350	<350	--
SWMU1	SWMU1-WP-3a	Soil	SWMU1-WP-3a-2013	10/14/2008	13	14	<350	<350	<350	<350	--
SWMU1	SWMU1-WP-3h	Soil	SWMU1-WP-3h-2014	10/7/2008	0	0.5	<350	<350	<350	<350	--
SWMU1	SWMU1-WP-3h	Soil	SWMU1-WP-3h-2015	10/7/2008	2	3	<330	<330	<330	<330	--
SWMU1	SWMU1-WP-3h	Soil	SWMU1-WP-3h-2016	10/7/2008	5	6	<340	<340	<340	<340	--
SWMU1	SWMU1-WP-5a	Soil	SWMU1-WP-5a-2019	10/5/2008	0	0.5	<330	<330	<330	<330	--
SWMU1	SWMU1-WP-5a	Soil	SWMU1-WP-5a-2020	10/5/2008	2	3	<340	<340	<340	<340	<5.2
SWMU1	SWMU1-WP-5a	Soil	SWMU1-WP-5a-2021	10/5/2008	5	6	<340	<340	<340	<340	--
SWMU1	SWMU1-WP-5a	Soil	SWMU1-WP-5a-2022	10/5/2008	5	6	<340	<340	<340	<340	--
SWMU1	SWMU1-WP-5a	Soil	SWMU1-WP-5a-2023	10/5/2008	7	8	<340	<340	<340	<340	--
SWMU1	SWMU1-WP-5a	Soil	SWMU1-WP-5a-2024	10/5/2008	9	10	<350	<350	<350	<350	--
SWMU1	SWMU1-WP-5a	Soil	SWMU1-WP-5a-2025	10/5/2008	11	12	<340	<340	<340	<340	--
SWMU1	SWMU1-WP-5a	Soil	SWMU1-WP-5a-2026	10/5/2008	13	14	<340	<340	<340	<340	--
SWMU1	SWMU1-WP-5h	Soil	SWMU1-WP-5h-2027	10/7/2008	0	0.5	<360	<360	<360	<360	--
SWMU1	SWMU1-WP-5h	WhitePowder	SWMU1-WP-5h-2028	10/7/2008	2	3	<350	<350	<350	<350	<5.8
SWMU1	SWMU1-WP-5h	Soil	SWMU1-WP-5h-2029	10/7/2008	5	5	<340	<340	<340	<340	--
SWMU1	SWMU1-WP-6a	Soil	SWMU1-WP-6a-2032	10/5/2008	0	0.5	<330	<330	<330	<330	--
SWMU1	SWMU1-WP-6a	Soil	SWMU1-WP-6a-2033	10/5/2008	2	3	<330	<330	<330	<330	<5.9
SWMU1	SWMU1-WP-6a	Soil	SWMU1-WP-6a-2034	10/5/2008	2	3	<330	<330	<330	<330	<4.8
SWMU1	SWMU1-WP-6a	Soil	SWMU1-WP-6a-2035	10/5/2008	5	6	<340	<340	<340	<340	--
SWMU1	SWMU1-WP-6a	Soil	SWMU1-WP-6a-2036	10/5/2008	7	8	<340	<340	<340	<340	--
SWMU1	SWMU1-WP-6a	Soil	SWMU1-WP-6a-2037	10/5/2008	9	10	<340	<340	<340	<340	--
SWMU1	SWMU1-WP-6a	Soil	SWMU1-WP-6a-2038	10/5/2008	11	12	<340	<340	<340	<340	--
SWMU1	SWMU1-WP-6a	Soil	SWMU1-WP-6a-2039	10/5/2008	13	14	<340	<340	<340	<340	--
SWMU1	SWMU1-WP-6h	WhitePowder	SWMU1-WP-6h-2040	10/6/2008	0	0.5	<340	<340	<340	<340	--
SWMU1	SWMU1-WP-6h	Soil	SWMU1-WP-6h-2041	10/6/2008	2	3	<340	<340	<340	<340	<4.7
SWMU1	SWMU1-WP-6h	Soil	SWMU1-WP-6h-2042	10/6/2008	5	6	<330	<330	<330	<330	--
SWMU1	SWMU1-WP-6h	Soil	SWMU1-WP-6h-2043	10/6/2008	5	6	<330	<330	<330	<330	--
SWMU1	SWMU1-WP-6h	Soil	SWMU1-WP-6h-2045	10/6/2008	9	10	<350	<350	<350	<350	--
SWMU1	SWMU1-WP-7	Soil	SWMU1-WP7-2046	10/6/2008	0	0.5	<350	<350	<350	<350	--
SWMU1	SWMU1-WP-7	WhitePowder	SWMU1-WP7-2047	10/6/2008	2	3	<370	<370	<370	<370	<7.9
SWMU1	SWMU1-WP-7	Soil	SWMU1-WP7-2048	10/6/2008	5	6	<340	<340	<340	<340	--
SWMU1	SWMU1-WP-7	Soil	SWMU1-WP7-2050	10/6/2008	9	10	<340	<340	<340	<340	--
SWMU1	SWMU1-WP-8	Soil	SWMU1-WP8-2053	10/6/2008	0	0.5	<340	<340	<340	<340	--
SWMU1	SWMU1-WP-8	Soil	SWMU1-WP8-2054	10/6/2008	2	3	<350	<350	<350	<350	<3.8
SWMU1	SWMU1-WP-8	Soil	SWMU1-WP8-2055	10/6/2008	5	6	<340	<340	<340	<340	--
SWMU1	SWMU1-WP-8	Soil	SWMU1-WP8-2057	10/6/2008	9	10	<340	<340	<340	<340	--
SWMU1	SWMU1-WP-9	Soil	SWMU1-WP9-2060	9/21/2008	0	0.5	<330	<330	<330	<330	--
SWMU1	SWMU1-WP-9	Soil	SWMU1-WP9-2061	9/21/2008	2	3	<340	<340	<340	<340	--
SWMU1	SWMU1-WP-9	Soil	SWMU1-WP9-2062	9/21/2008	2	3	<340	<340	<340	<340	--
SWMU1	SWMU1-WP-9	Soil	SWMU1-WP9-2063	9/21/2008	5	6	<340	<340	<340	<340	--
SWMU1	SWMU1-WP-9	Soil	SWMU1-WP9-2064	9/21/2008	7	8	<340	<340	<340	<340	--
SWMU1	SWMU1-WP-9	Soil	SWMU1-WP9-2065	9/21/2008	9	10	<340	<340	<340	<340	--
SWMU1	SWMU1-WP-9	Soil	SWMU1-WP9-2066	9/21/2008	11	12	<350	<350	<350	<350	--
SWMU1	SWMU1-WP-9	Soil	SWMU1-WP9-2067	9/21/2008	13	14	<340	<340	<340	<340	--

Table A-2
Data for 2,4-Dimethylphenol, 4-Methylphenol,
Butyl Benzyl Phthalate, Dibenzofuran, and Methyl Acetate in Solid Matrices

Attachment 1 to Technical Memorandum 4
PG&E Topock
Needles, California

RFI Area	Location	Matrix	Sample ID	Sample Date	Top Depth (ft bgs)	Bottom Depth (ft bgs)	2,4-dimethylphenol (µg/kg)	4-methylphenol (µg/kg)	Butyl benzyl phthalate (µg/kg)	Dibenzofuran (µg/kg)	Methyl acetate (µg/kg)
SWMU1	SWMU1-WP-T3a	Soil	SWMU1-WP-T3a-2076	10/5/2008	0	0.5	<340	<340	<340	<340	--
SWMU1	SWMU1-WP-T3a	Soil	SWMU1-WP-T3a-2077	10/5/2008	2	3	<340	<340	<340	<340	<5.3
SWMU1	SWMU1-WP-T3a	Soil	SWMU1-WP-T3a-2078	10/5/2008	5	6	<350	<350	<350	<350	--
SWMU1	SWMU1-WP-T3a	Soil	SWMU1-WP-T3a-2079	10/5/2008	5	6	<350	<350	<350	<350	--
SWMU1	SWMU1-WP-T3a	Soil	SWMU1-WP-T3a-2080	10/5/2008	7	8	<350	<350	<350	<350	--
SWMU1	SWMU1-WP-T3a	Soil	SWMU1-WP-T3a-2081	10/5/2008	9	10	<330	<330	<330	<330	--
SWMU1	SWMU1-WP-T3a	Soil	SWMU1-WP-T3a-2082	10/5/2008	11	12	<340	<340	<340	<340	--
SWMU1	SWMU1-WP-T3a	Soil	SWMU1-WP-T3a-2083	10/5/2008	13	14	<350	<350	<350	<350	--

Notes:

Data from Soil Part A Datadump (04.29.09): ftp://ftp.ch2m.com/Topock_DTSC_Site/
AOC = Area of Concern
ft bgs = feet below ground surface
RCRA = Resource Conservation and Recovery Act
RFI = RCRA Field Investigation
SE = sediment
SWMU = Solid Waste Management Unit
< = not detected at reporting limit noted.
-- = not analyzed.

Figures

Figure A-1
Sample ECV HQ Calculation for Gamma-Chlordane

Attachment 1 to Technical Memorandum 4
Topock Compressor Station
Needles, California

ECV for gamma-Chlordane Based on Cactus Wren Exposure

Species-Specific Exposure Parameters [a]		
Body Weight (kg; BW)	0.0389	
Food Intake Rate (kg_{tissue}/day, dw; FIR)	0.00713	
Soil Ingestion Rate (kg_{soil}/day, dw; FIR)	0.00066309	
Site Use Factor (unitless; SUF)	1.00	
Bioaccumulation Factor (Ct/Cs; BAF)	24.30	
Diet Composition		Representative EPC
Invertebrate	100%	Soil to invertebrate uptake equation (see below)

gamma-Chlordane Concentrations In Specific Media		
		Calculation Method
ECV = C_{soil} ($mg_{gamma\text{-}Chlordane}/kg_{soil}$)	0.470	Selected ECV [b]
C_{invert} ($mg_{gamma\text{-}Chlordane}/kg_{invert}$) = C_{soil} * BAF	11.414	Tissue Concentration [c]

Toxicity Reference Value (TRV)	
Avian NOAEL for gamma-Chlordane [d] ($mg_{gamma\text{-}Chlordane}/kg_{BW}$-day)	2.1

Equations [e]
HQ = Dose($mg_{gamma\text{-}Chlordane}/kg_{BW}$-day) / TRV($mg_{gamma\text{-}Chlordane}/kg_{BW}$-day)
Dose = ([(C_{soil} * SIR) + (C_{invert} * FIR)] / BW) * SUF

Incidental Soil Ingestion ($mg_{gamma\text{-}Chlordane}/kg_{BW}$-day)

ADD_{soil} =([C_{soil} * SIR] / BW) * SUF

ADD_{soil} = ([0.470 *0.00066309] / 0.0389) * 1.00

0.0080064

Ingestion from invertebrates ($mg_{gamma\text{-}Chlordane}/kg_{BW}$-day)

ADD_{invert} =([C_{invert} * FIR] /BW) * SUF

where C_{invert} = C_{soil} * BAF = (0.47 * 24.3) = 11.414

ADD_{invert} = ([11.414 * 0.00713] / 0.0389) * 1.00

2.092

Total Dose ($mg_{gamma\text{-}Chlordane}/kg_{BW}$-day)

Total Dose = ADD_{soil} + ADD_{invert}

Total Dose = 0.0080064 + 2.092

2.100

Hazard Quotient (unitless)

HQ = Dose / TRV

HQ = 2.1 / 2.1

1.00

Notes:

a. Species specific exposure parameters obtained from Table 6-3 of the Draft Human Health and Ecological Risk Assessment Work Plan.
b. ECV value obtained from Table 1.
c. Tissue concentration obtained from Attachment 1 Table.
d. TRV obtained from Attachment 1 Table.
e. Equations obtained from Technical Memorandum 3: Ecological comparison values for Metals and PAHs in Soil.

% = percent
ADDx = Average Daily Dose from "x" medium (soil, invertebrates)
BAF = bioaccumulation factor
BW = body weight
C_{invert} = concentration of chemical in invertebrate tissue
C_{soil} = concentration of chemical in soil
Ct/Cs = concentration of chemical in tissue per concentration of chemical in soil
dw = dry weight
TRV = toxicity reference value
ECV = Ecological Comparison Value
EPC = exposure point concentration
FIR = food ingestion rate
HQ = hazard quotient
kg/day = kilograms per day
mg/kg = milligrams per kilogram
mg/kg_{BW}-day = milligrams per kilogram body weight per day
NOAEL = no-observed adverse effect level
SUF = site use factor

Figure A-2
Sample ECV HQ Calculation for Cyanide

Attachment 1 to Technical Memorandum 4
Topock Compressor Station
Needles, California

ECV for Cyanide Based on Cactus Wren Exposure

Species-Specific Exposure Parameters [a]		
Body Weight (kg; BW)	0.0389	
Food Intake Rate (kg_{tissue}/day, dw; FIR)	0.00713	
Soil Ingestion Rate (kg_{soil}/day, dw; FIR)	0.00066309	
Site Use Factor (unitless; SUF)	1.00	
Bioaccumulation Factor (Ct/Cs; BAF)	0.00	
Diet Composition		Representative EPC
Invertebrate	100%	Soil to invertebrate uptake equation (see below)

Cyanide Concentrations In Specific Media		
		Calculation Method
ECV = C_{soil} ($mg_{cyanide}/kg_{soil}$)	2.35	Selected ECV[b]
C_{invert} ($mg_{cyanide}/kg_{invert}$) = C_{soil} * BAF	0.0	Tissue Concentration[c]

Toxicity Reference Value (TRV)	
Avian NOAEL for cyanide[d] ($mg_{cyanide}/kg_{BW}$-day)	0.04

Equations [e]
HQ = Dose($mg_{cyanide}/kg_{BW}$-day) / TRV($mg_{cyanide}/kg_{BW}$-day)
Total Dose = ([(C_{soil} * SIR) + (C_{invert} * FIR)] / BW) * SUF

Incidental Soil Ingestion ($mg_{cyanide}/kg_{BW}$-day)
ADD_{soil} =([C_{soil} * SIR] / BW) * SUF
ADD_{soil} = ([2.35 *0.00066309] / 0.0389) * 1.00
0.040

Ingestion from invertebrates ($mg_{cyanide}/kg_{BW}$-day)
ADD_{invert} =([C_{invert} * FIR] /BW) * SUF
where C_{invert} = C_{soil} * BAF = (2.35 * 0) = 0
ADD_{invert} = ([0 * 0.00713] / 0.0389) * 1.00
0.0

Total Dose ($mg_{cyanide}/kg_{BW}$-day)
Total Dose = ADD_{soil} + ADD_{invert}
Total Dose = 0.040 + 0.0
0.040

Hazard Quotient (unitless)
HQ = Dose / TRV
HQ = 0.04 / 0.04
1.00

Notes:
a. Species specific exposure parameters obtained from Table 6-3 of the Draft Human Health and Ecological Risk Assessment Work Plan.
b. ECV value obtained from Table 1.
c. Tissue concentration equation obtained from Attachment 1 Table.
d. TRV obtained from Attachment 1 Table.
e. Equations obtained from Technical Memorandum 3: Ecological comparison values for Metals and PAHs in Soil.

% = percent
ADDx = Average Daily Dose from "x" medium (soil, invertebrates)
BAF = bioaccumulation factor
BW = body weight
C_{invert} = concentration of chemical in invertebrate tissue
C_{soil} = concentration of chemical in soil
Ct/Cs = concentration of chemical in tissue per concentration of chemical in soil
dw = dry weight
ECV = Ecological Comparison Value
EPC = exposure point concentration
FIR = food ingestion rate
HQ = hazard quotient
kg/day = kilograms per day
mg/kg = milligrams per kilogram
mg/kg_{BW}-day = milligrams per kilogram body weight per day
NOAEL = no-observed adverse effect level
SUF = site use factor
TRV = toxicity reference value

Figure A-3
Pesticide Screening Levels for Soil Invertebrates

Attachment 1 to Technical Memorandum 4
PG&E Topock
Needles, California

Pesticide	Toxicity Data (Van de Plasche, 1994)	Based on	Uncertainty Factor (UF)	NOAEC	
DDT	10000 ug/kg	LC50	100 DTSC/USEPA	100 ug/kg	NOAEC based on 10%TOC
Chlordane	4300 ug/kg	LC50	100 DTSC/USEPA	43 ug/kg	NOAEC based on 10%TOC
Dieldrin	500 ug/kg	NOAEC	1 DTSC/USEPA	500 ug/kg	NOAEC based on 10%TOC

% = percent
DTSC = California Department of Toxic Substances Control
NOAEC = no-observed adverse effects concentration
TOC = total organic carbon
ug/kg = micrograms per kilogram
USEPA = United States Environmental Protection Agency

Van de Plassche, E.J. 1994. Towards Integrated Environmental Quality Objectives for Several Compounds with a Potential for Secondary Poisoning. National Institute of Public Health and Environmental Protection. The Netherlands. RIVM Report 679-101-012. 132 pp.

Figure A-4
Adjusting Total Organic Carbon for Screening Levels from 10% to 1%

Attachment 1 to Technical Memorandum 4
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Steps:

1 Use screening value of chemical "X" in micrograms per kilogram (ug/kg) based on 10% total organic carbon (TOC) (see Figure A-3 [NOAEC worksheet]).
2 Normalize the screening value by dividing the screening value by 10%TOC (0.1 kilogram [kg] TOC/kg soil).
3 Multiply by conversion units (1000 micrograms [ug] X/ milligrams [mg] X) to present results in mgX/kgTOC.
4 Use results of mgX/kgTOC based on Steps 1 through 3.
5 Convert to dry weight assuming 1%TOC (0.01 kg TOC/kg soil).
6 Results are soil invertebrate ecological comparison values ECVs (reported in Table 1 and Table A-1).

Soil Screening Value for DDT = **100 ug/kg**

Step 1		Step 2		Step 3		Step 4
100 ug DDT / 1 kg soil	x	1 kg soil / 0.1 kg TOC	x	1 mg DDT / 1000 ug DDT	=	1 mg DDT / 1 kg TOC

Results from Step 4		Step 5		Step 6
1 mg DDT / 1 kg TOC	x	0.01 kg TOC / 1 kg soil	=	0.01 mg DDT / kg soil

Soil Invertebrate ECV for DDT

0.01 mg DDT / kg soil

Soil Screening Value for Chlordane = **43 ug/kg**

Step 1		Step 2		Step 3		Step 4
43 ug chlordane / 1 kg soil	x	1 kg soil / 0.1 kg TOC	x	1 mg chlordane / 1000 ug chlordane	=	0.43 mg chlordane / 1 kg TOC

Results from Step 4		Step 5		Step 6
0.43 mg DDT / 1 kg TOC	x	0.01 kg TOC / 1 kg soil	=	0.0043 mg chlordane / kg soil

Soil Invertebrate ECV for chlordane

0.0043 mg chlordane / kg soil

Soil Screening Value for Dieldrin = **500 ug/kg**

Step 1		Step 2		Step 3		Step 4
500 ug dieldrin / 1 kg soil	x	1 kg soil / 0.1 kg TOC	x	1 mg dieldrin / 1000 ug dieldrin	=	5 mg dieldrin / 1 kg TOC

Results from Step 4		Step 5		Step 6
5 mg DDT / 1 kg TOC	x	0.01 kg TOC / 1 kg soil	=	0.05 mg dieldrin / kg soil

Soil Invertebrate ECV for dieldrin

0.05 mg dieldrin / kg soil