

August 28, 2000

Ms. Susan Yugo  
Alameda County Department of Environmental Health  
1131 Harbor Bay Parkway  
Alameda, California 94502-6577

**RE: Remediation Goal for PCBs at the Pacific Gas and Electric Company Emeryville  
Materials Facility, 4525 Hollis Street, Emeryville, California (the Site)**

Dear Ms. Yugo,

SECOR International Incorporated (SECOR) has prepared this letter on behalf of Pacific Gas and Electric Company's (the Company) Technical and Ecological Services (TES), to support the risk-based soil remediation goal of 25 milligrams per kilogram (mg/kg) for polychlorinated biphenyls (PCBs) at the above-referenced site.

The remediation goal is based on a Tier 2 Risk-Based Corrective Action (RBCA) report prepared by EMCON dated March 7, 1997. In that report, the following site-specific target levels (SSTLs) for PCBs were developed:

- Industrial worker: 1.3 mg/kg;
- Construction worker: 88 mg/kg; and
- Utility worker: 106 mg/kg.

The arithmetic mean PCB concentration across the site in the absence of any excavation or remediation is about 30 mg/kg. Limited excavation of soil containing the highest PCB concentrations, located at soil borings B1 and B16, would result in an arithmetic mean and a 95 percent upper confidence limit of the arithmetic mean (95UCL) PCB concentration in the upper two foot soil interval across the site of 1.2 and 1.9 mg/kg (as reported in Table 4-1 of EMCON, 1996). Therefore, the limited excavation option is preferred by the Company. Under this option, soil containing PCB concentrations above the proposed remediation goal of 25 mg/kg in shallow soils (i.e., 0 to 2 feet below ground surface [bgs]) will be removed from the site.

A telephone discussion regarding this 25 mg/kg level was held with you, Mr. Fred Flint of TES, and Dr. Mark Stelljes of SECOR on August 9, 2000. During this call, you requested that a letter be prepared justifying the selection of 25 mg/kg as a health-protective remediation target level. Additionally, you requested that additional information be provided beyond that contained in the original Tier 2 RBCA report. The following information was requested in order to gain approval of the 25 mg/kg remediation goal:

- Statistical evaluation of datasets used in the Tier 2 RBCA to identify 95 percent upper confidence limits of the arithmetic mean (95UCLs);
- Statistical evaluation of datasets (arithmetic mean and 95UCLs) if soil from B1 and B16 were removed from the Site;

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- Further justification of site-specific exposure assumptions used in the Tier 2 RBCA report; and
- Clear discussion of why the 25 mg/kg target level is safe and protective of human health.

Each of these points is discussed below.

### **Statistical Evaluation**

Complete Soil Dataset. As reported in the Tier 2 RBCA, the arithmetic mean PCB concentration across the site is 30 mg/kg. This includes all samples between 0 and 10 feet bgs, as summarized in Table 1. As shown on the table, the 95UCL for this dataset is 49.7 mg/kg.

Soil Dataset with Limited Excavation. Also as reported in the Tier 2 RBCA, an arithmetic mean PCB soil concentration was calculated using the assumption that soil from the two boring locations with the highest PCB concentrations (B1 down to 7.5 feet and B16 down to 4.5 feet) would be excavated and removed from the site. The arithmetic mean concentration of PCBs in the remaining soil is 5.7 mg/kg, and the 95UCL is 9.4 mg/kg (Table 1). This includes all remaining data points down to 10 bgs.

### **Additional Justification for Site-Specific Parameters Used in the RBCA**

The following exposure assumptions were listed as "site-specific" in the Tier 2 RBCA:

- Construction worker exposure duration (1 year);
- Construction worker exposure frequency (30 days);
- Utility line worker exposure duration (25 years); and
- Utility line worker exposure frequency (1 day/year).

Default assumptions have not been published by either the California EPA (CalEPA) or USEPA for these receptors. Therefore, these assumptions were compiled from CalEPA and USEPA sources for other receptors using upper percentile values and based on previous professional experience with California risk assessments. Further support for these parameters is discussed below.

Construction Worker Exposure Duration and Frequency. A construction worker represents someone involved with site development activities. Invasive activities that could lead to direct soil contact include constructing a building foundation. This activity is typically assumed to represent a one-time event because the same construction worker is not expected to be contracted to invasively work at the same site twice. Common risk assessment protocol assumes that the shortest exposure duration typically quantified is one year. Therefore, an exposure duration of one year was used for this receptor. This assumes that the invasive activities are completed within 365 days. The exposure frequency represents the number of days the same construction worker is expected to be involved with invasive activities. Typical foundations are now

constructed in a matter of a few days (e.g., two to five). Therefore, the exposure frequency for such a worker should be low. A period of 30 days was used for this receptor, which is expected to represent a reasonable maximum exposure (RME) frequency. This is more than 5 times the typical length of foundation construction. This assumes that the same person is digging in the ground for 30 days, and that all digging occurs at locations containing the exposure point concentration. In reality, many of the places where digging would occur contain no PCBs. Therefore, these assumptions are expected to be generally conservative and health-protective.

Utility Worker Exposure Duration and Frequency. Unlike the construction worker where a single event taking several days is assumed to occur, a utility worker receptor represents someone that may maintain or repair underground utilities on a long-term, but intermittent, basis at the site. Trench workers are typically from utility companies, and it is unlikely the same employee would be asked to repair a trench at the same site over a period of several years. Instead, different people would respond to service call requests at different times. Therefore, it was assumed that the exposure frequency would be no more than 1 day each year. This is still conservative because it assumes that a repair job takes a full day, requires soil excavation, and occurs in a location where PCBs are present at the assumed concentration. This conservatism is compounded through the use of an exposure duration of 25 years, which is the recommended upper-bound exposure duration for time spent by a worker at the same workplace (USEPA and CalEPA). Therefore, these two assumptions result in a total exposure of 25 days over a lifetime. This is very conservative, as it is very unlikely the same contracting employee would spend 25 days at the contaminated portion of this site over their career with the same employer.

#### **Summary of Health Protectiveness of Proposed Remediation Target Level**

USEPA changed the cancer potency of PCBs in late 1996. Prior to then, the cancer slope factor (SF) for PCBs was  $7.7 \text{ (mg/kg-day)}^{-1}$ . This value was used in the Tier 2 RBCA report. Subsequently, the SF was modified to incorporate a range of potencies depending on the exposure pathways. For the direct soil pathways evaluated in the RBCA report, an SF of  $2.0 \text{ (mg/kg-day)}^{-1}$  is relevant based on the recent USEPA guidance (USEPA, 1996, 2000). Recently, CalEPA also adopted this lower SF of  $2.0 \text{ (mg/kg-day)}^{-1}$  for some pathways (CalEPA, 2000). This SF is 3.85 times lower than the old value of 7.7. Therefore, all SSTLs reported by EMCON (1997) can be multiplied by 3.85 to account for recent toxicology knowledge of PCBs and humans. The lowest SSTL of 1.3 mg/kg, for the industrial worker, becomes 5.0 mg/kg. SSTLs for the other two receptors are both greater than 350 mg/kg. Only one location contained PCBs greater than 350 mg/kg (location B1), and this location will be excavated during site remediation. Therefore, the proposed excavation will result in all site concentrations below levels of concern to human health for these two receptors.

Following limited excavation of soil at B1 and B16, the overall site PCB mean concentration is 5.7 mg/kg based on existing data. The 95UCL is 9.4 mg/kg (Table 1). Clean fill will be used to bring these two locations to grade, which will lower the overall site PCB concentration. Also, surface concentrations are generally lower than deeper concentrations. Exposure by an industrial worker receptor is only assumed to involve surface soils, which includes the depth interval between 0 and 2 feet only. The 95UCL for the 0 to 2 feet bgs soil interval following this proposed excavation is 1.9 mg/kg (Table 1), which is below the revised SSTL of 5.0 mg/kg. Therefore, the proposed excavation is health protective for all receptors evaluated in the Tier 2 RBCA.

August 28, 2000

Based on the above information, the location of PCBs present in soils at the site, and the expected use of the area, the proposed remediation target of 25 mg/kg is health protective of all evaluated human receptors.

We hope this adequately addresses your concerns raised in the telephone conversation, and will enable you to approve the proposed limited excavation as protective of human health without additional remediation at the Site.

Sincerely,

**SECOR International Incorporated**

A handwritten signature in cursive script, appearing to read "David Jeffrey".

David Jeffrey, Ph.D.  
Risk Assessment Manager

cc: Mr. Fred Flint (Pacific Gas and Electric Company, TES)

**REFERENCES**

California Environmental Protection Agency (CalEPA). 2000. Toxicity Criteria Database. Office of Environmental Health Hazard Assessment. Online at this address: <http://www.oehha.ca.gov/risk/chemicalDB/index.asp>.

EMCON, 1997. Risk-Based Corrective Action Report, Former Aboveground Mineral Oil Storage Tank Area, Emeryville Materials Facility, Emeryville, California. March 7.

U.S. Environmental Protection Agency (USEPA). 1996. PCBs: Cancer Dose-Response Assessment and Application to Environmental Mixtures. National Center for Environmental Assessment, Washington, D.C. EPA/600/P-96/001F. September.

U.S. Environmental Protection Agency (USEPA). 2000. Integrated Risk Information System. Online database. August.

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Cook  
516 540-3843

**Table 1. Statistical Analysis<sup>a</sup>**  
**PCBs in Soil**  
**PG&E Materials Facility**  
**Emeryville, California**

Sample ID	Sample Depth (feet)	PCB Concentration <sup>b</sup>		
		Full Dataset (mg/kg)	Limited Excavation Dataset 0-10 feet bgs (mg/kg)	Limited Excavation Dataset 0-2 feet bgs (mg/kg)
B1	0-1.5	38		
B1	1.5-3.0	0.5		
B1	3.0-4.5	385		
B1	4.5-6.0	350		
B1	6.0-7.5	295		
B1	7.5-9.0	2	2	
B2	1.0-2.0	4	4	4
B2	2.0-3.0	0.5	0.5	
B2	4.0-6.0	0.5	0.5	
B2	6.0-6.5	19	19	
B4	0-1.5	0.5	0.5	0.5
B4	1.5-3.0	0.5	0.5	0.5
B4	3.0-4.5	0.5	0.5	
B4	4.5-6.0	0.5	0.5	
B4	6.0-7.5	11	11	
B4	7.5-9.0	8	8	
B7	1.5-3.0	0.5	0.5	0.5
B7	4.5-6.0	0.5	0.5	
B7	7.5-9.0	0.5	0.5	
B9	0-1.5	2	2	2
B9	1.5-3.0	1	1	1
B9	3.0-4.5	2	2	
B9	4.5-6.0	4	4	
B9	6.0-7.5	93	93	
B9	7.5-9.0	13	13	
B10	1.5-3.0	0.5	0.5	0.5
B10	4.5-6.0	0.5	0.5	
B10	7.5-9.0	0.5	0.5	
B12	1.5-3.0	0.5	0.5	0.5
B12	4.5-6.0	0.5	0.5	
B12	7.5-9.0	0.5	0.5	
B14	2.5-3.0	0.5	0.5	
B14	3.0-4.5	5	5	
B14	4.5-6.0	15	15	
B14	6.0-7.5	12	12	
B14	7.5-9.0	16	16	

**Table 1. Statistical Analysis<sup>a</sup>  
PCBs in Soil  
PG&E Materials Facility  
Emeryville, California**

Sample ID	Sample Depth (feet)	PCB Concentration <sup>b</sup>		
		Full Dataset (mg/kg)	Limited Excavation Dataset 0-10 feet bgs (mg/kg)	Limited Excavation Dataset 0-2 feet bgs (mg/kg)
B16	0-1.5	185		
B16	1.5-3.0	10		
B16	3.0-4.5	32		
B16	4.5-6.0	0.5	0.5	
B16	6.0-7.5	18	18	
B16	7.5-9.0	9	9	
ESE-1	5	0.5	0.5	
ESE-1	10	0.5	0.5	
ESE-2	5	0.5	0.5	
ESE-2	9	0.5	0.5	
ESE-2	10	0.5	0.5	
ESE-3	5	0.5	0.5	
ESE-3	10	0.5	0.5	
ESE-4	5	0.5	0.5	
ESE-4	10	0.5	0.5	
<b>Statistical Analysis</b>				
Arithmetic Mean		30.2	5.7	1.2
Sample Size		51	43	8
Standard Deviation		84.7	14.7	1.3
95th Confidence Interval		19.5	3.7	0.7
95 Upper Confidence Limit (95UCL)		49.7	9.4	1.9

**Abbreviations:**

PCB - Polychlorinated biphenyl

**Footnotes:**

<sup>a</sup> Raw data from EMCON (1997).

<sup>b</sup> One-half the detection limit is used to represent non-detect samples.