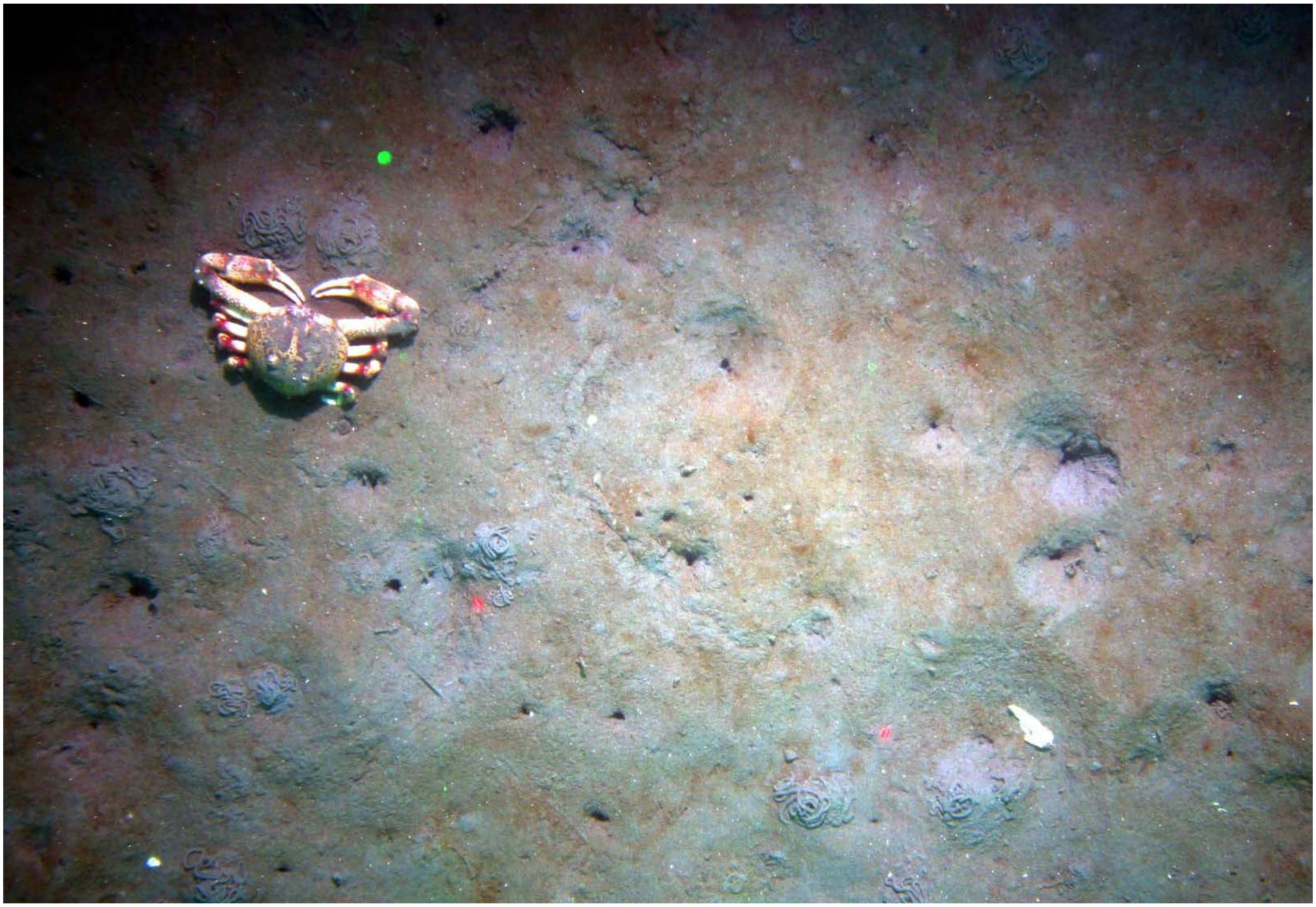
Estimation of Santa Monica Bay Water Column Concentration of DDTs and PCBs

November 2011



SANITATION DISTRICTS OF LOS ANGELES COUNTY

Cover

Soft bottom habitat at a depth of 20 meters on the San Pedro shelf. Grey bottom sediments are covered, where undisturbed, by growth of brown benthic diatoms. The crab in the upper left is *Randallia ornata*, the globose sand crab. A few polychaete worm tubes are visible protruding from or laying across the surface. Castings piles are above the tubemouths of other polychaetes of the family Maldanidae. The red and green lasers are used as a reference to measure distance. The distance between the two red laser points is 20cm.

November 23, 2011

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Abstract

The mass and the average concentration of DDTs (DDD, DDE, and DDT) and PCBs in the water column of the Santa Monica Bay (SMB) and the Palos Verdes (PV) areas are estimated. The estimation procedure uses spatially and temporally matched sediment and water column chemistry data to develop sediment to near bottom water (one meter above sediment) translator values for DDTs and PCBs. These translators were applied to a spatially and temporally extensive set of sediment chemistry data to provide near bottom water column concentrations throughout the SMB and PV areas. Nearest neighbor bottom water concentration estimates and previously developed water column concentration decay curves (Zeng 1999, 2005) were then used to model DDT and PCB concentrations throughout the water column at specific volume-grid points representing the SMB and PV areas. The mass of DDTs and PCBs were then calculated from the water column profile data at each point and combined to estimate the mass and concentration of DDTs and PCBs in the PV area and within three subdivisions of the SMB area.

The estimated concentrations and (total mass) of DDTs and PCBs within the entire SMB area were 0.027 ng/L (7.56 kg) and 0.007 ng/L (1.82 kg) respectively. However, a concentration gradient was evident with highest concentrations in the nearshore area (0.057 ng/L DDTs and 0.016 ng/L PCBs) and lowest concentrations within the offshore boundary area (0.018 ng/L DDTs and 0.004 ng/L PCBs). As would be expected, the concentrations within the PV area were two to three times higher than the SMB. Specifically, PV area water column concentrations for DDTs and PCBs were 0.078 ng/L (5.24 kg) and 0.017 ng/L (1.16 kg) respectively. The estimated water column concentrations within the SMB and PV areas is consistent with previous estimates using a much more spatially and temporally limited dataset. These values will be utilized in modeling of contaminant fate and transport and load allocations associated with the SMB DDTs and PCBs TMDL being developed by the United States Environmental Protection Agency, Region 9 (EPA) staff.

Methods

Study Region

The boundaries for PV and SMB areas A, B, and C were established an EPA contractor (Tetra Tech, Inc.) for a sediment and toxicant transport model for SMB. SMB area C is equivalent to the “Nearshore SMB” box; area B is equivalent to the “Receiver” box; and area A is equivalent to the “Ocean Boundary” box. The boundary for the PV area was created by continuing the outer boundary of area A downcoast to an intersection with a line extending directly south from Pt. Fermin. The PV area encompasses both the narrow shelf as well as the slope and part of the basin floor where the highest mass of DDTs and PCBs are known to exist (LACSD 2010, Maruya and Schiff 2009, USEPA 2007, Schiff et al. 2006, Noblet et al. 2003).

For the entire SMB a volume grid of twenty equally spaced, parallel transect lines with points spaced one-kilometer apart from the offshore boundary to the shoreline was developed (**Figure 1**). For assessments of the sub-areas, similar (i.e. 20 transects and 1 km spacing) volume grids were developed for the area of interest. The water depth at each grid point was found by using a lookup table of bathymetry data for the SMB region (available online at http://www.sccoos.org/data/bathy/?r=3).

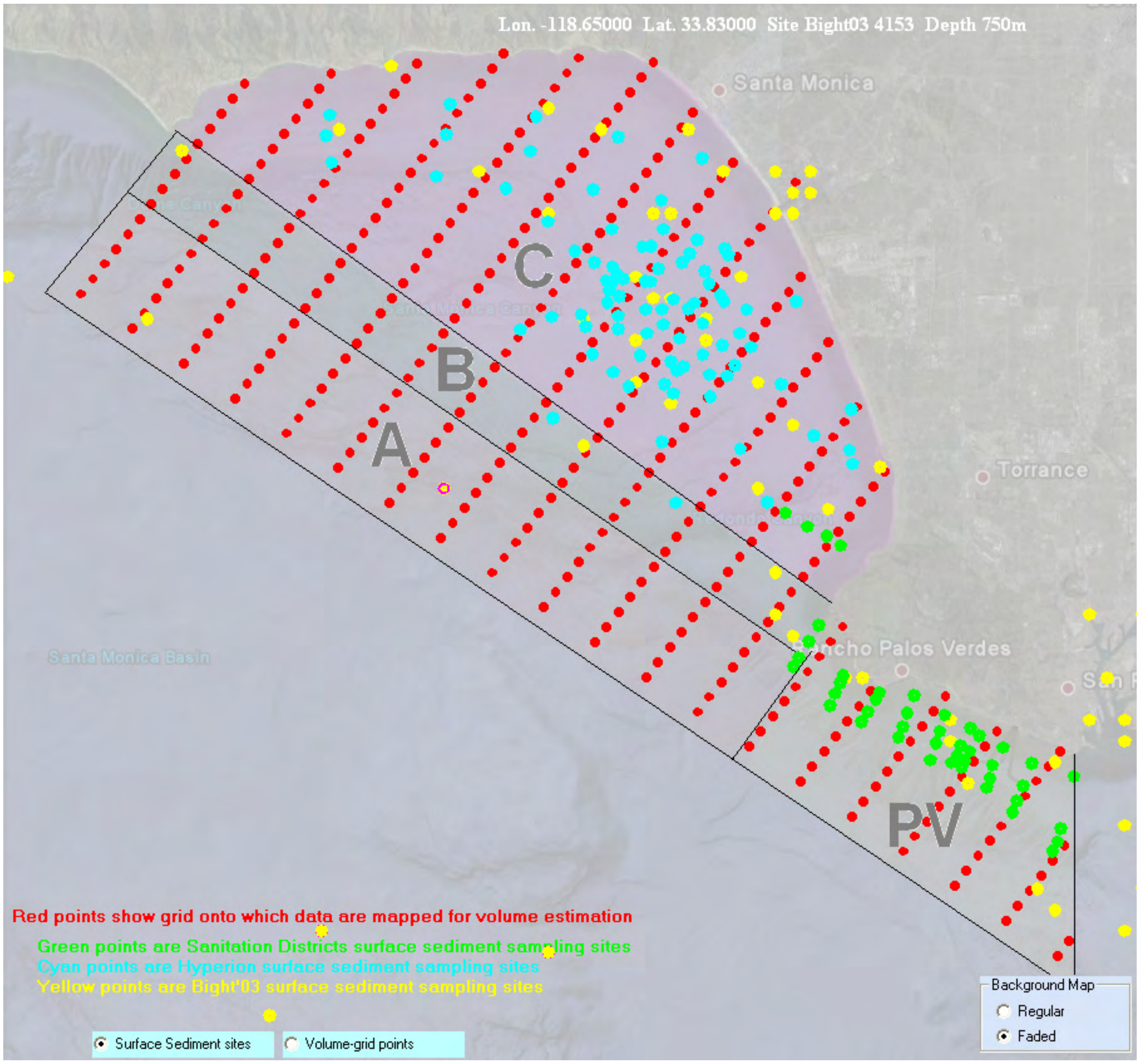

Figure 1 - Modeled area showing various SMB boundaries with modeled grid points (red) and Sanitation Districts (green), Hyperion (cyan) and Bight'03 (yellow) sediment chemistry sampling sites

Surface Sediment Data

A lookup table of surface sediment data was assembled from City of Los Angeles (Hyperion), Sanitation Districts of Los Angeles County (Sanitation Districts), and Southern California Bight Regional Monitoring (Bight'03) data sets (**Appendix 1**). All DDT isomers and degradation products and PCBs measured as Aroclors or congeners from 1995 through 2008 at the Hyperion and Sanitation Districts sites were initially considered (**Appendix 2** lists the sub-constituents used). A subset of Bight'03 sites located within the longitudes from Pt. Dume to Pt. Fermin (-118.90 to –118.25; Figure 1) were also utilized. In the POTW monitoring data there were multiple sampling events between 1995 and 2008, with replicate sampling done at some sites.

Analyses conducted by Tetra Tech, Inc. determined that p,p'-DDE was a suitable surrogate for total DDTs, representing on average 96% of the total DDTs. Therefore, at each site the average p,p'-DDE concentration was determined, using all available results. If p,p'-DDE was not detected (ND) then ½ the reporting level (RL) was substituted. For the Sanitation Districts' data, 100% of p,p'-DDE results were detected; for Hyperion, over 99% of p,p'-DDE was detected; and for Bight'03 data 95% was detected.

Publicly owned treatment works (POTW) monitoring historically measured Aroclors in sediments. Aroclor 1254 was the maximum average Arachlor species at 77% of Sanitation Districts' sites and 85% of Hyperion sites. More recently the POTW programs have begun measuring PCB congeners. For Sanitation Districts' congener sampling, at least a single congener was detected at 15 of 24 sites and most commonly the highest concentration congener species was Congener 101. For Hyperion congener sampling, at least a single congener was detected at 7 of 9 sites, with no single species dominating. It is notable that relative to Aroclor sampling, the congener sampling results represent a sub-set of sites and a more recent time frame. The Sanitation Districts' surface sediment data set only includes congener results for the years 2006-2008, and congener analyses were only done at 24 of 44 benthic sites. The Hyperion congener analyses were done annually from 2005 to 2008 at nine of 89 sites. For Bight'03 data only congeners were analyzed, and at least one congener was detected at 44 of 76 sites. The peak congener species was more variable, but 34% were Congener 110. To maximize the use of both PCBs measured as Aroclors and congeners, Tetra-tech, Inc. determined that total PCBs could be derived from either a sum of congeners or the maximum Arochlor. Therefore, at each site the sum of all analyzed congeners was created, using ½ the RL for all ND congener species. At sites without PCB congener results, the highest average single Aroclor species was determined, using ½ the RL for all ND values.

Table 1 summarizes the results from analysis of the three sediment chemistry data sets combined into the final lookup table.

Table 1 - Summary of the sediment chemistry data assembled for the lookup table

	Hyperion (SMB)	Sanitation Districts (PV)	Bight'03 (SMB and PV)
Number of sites	89	44	76
p,p'-DDE	56.7	3224	164
Max PCB (Aroclor)	42.6 (Aroclor 1254*)	337 (Aroclor 1254*)	NA
Sum PCB (congener)	33.0 (multiple*)	499 (Congener 101*)	108 (Congener 110*)

*All DDE and PCB values are in µg/dry kg, NA = Not Available, * most common highest PCB constituent*

Water column data

Two sources of measured water column concentrations of total DDT and total PCB concentration were used in this estimation. Zeng (1999) made measurements one meter above the bottom at eight sites on the PV shelf where the Sanitation Districts also collects surface sediment samples for chemistry analyses. The water column samples were collected in winter and summer of 1997 using glass fiber filters for particulates and XAD-II resins in Teflon columns for dissolved fractions. Seasonal and replicate data were averaged and particulate and dissolved fractions were summed to produce a single value for each site/depth, as shown in **Table 2**.

Zeng (2005) also published results of solid phase microextraction (SPME) measurements of p,p'-DDE water column levels at several sites in SMB (results summarized in **Table 3**). The SPMEs used in this study were deployed two meters above the bottom and at selected depths further up in the water column. There were no PCB measurements associated with this second study.

Table 2 – Zeng (1999) published total DDT and PCB concentration data as used in the mass estimator (depths are above bottom; all concentrations in ng/l)

Constituent	Site	Dep	GIS-latitude	GIS-longitude	1m	2m	5m	10m	20m	35m
DDT	0C	60	33.8072	-118.4305	3.3					
DDT	3C	60	33.73	-118.4025	6.05					
DDT	5C	60	33.7147	-118.366	9.8					
DDT	6C	60	33.7078	-118.354	11.6	13.05	8.1		2.4	0.7
DDT	7C	60	33.7052	-118.3487	7.7					
DDT	9C	60	33.6887	-118.3183	5.15					
DDT	6B	150	33.703	-118.3558	5.5					
DDT	6D	30	33.7163	-118.3485	5.1					
PCB	0C	60	33.8072	-118.4305	0.28					
PCB	3C	60	33.73	-118.4025	0.61					
PCB	5C	60	33.7147	-118.366	0.83					
PCB	6C	60	33.7078	-118.354	0.86	1	0.68		0.245	0.135
PCB	7C	60	33.7052	-118.3487	0.61					
PCB	9C	60	33.6887	-118.3183	0.31					
PCB	6B	150	33.703	-118.3558	0.43					
PCB	6D	30	33.7163	-118.3485	0.58					

Table 3 – Zeng (2005) published p,p'-DDE concentration data as used in the mass estimator (depths are above bottom; all concentrations in ng/l)

Constit-uent	Bight'03 Site ID	Dep (m)	GIS-latitude	GIS-longitude	2m	10m	20m	35m	Surface
p,p'-DDE	4006	60	33.86037	-118.44677	0.93	1.08		0.24	0.041a
p,p'-DDE	4021	36	33.9286	-118.48108	0.48	0.21			
p,p'-DDE	4037	60	33.9976	-118.71103	0.41	0.47		0.059a	<0.097
p,p'-DDE	4086	94	33.83413	-118.46887	1.54	1.21			
p,p'-DDE	4089	83	33.84782	-118.56702	0.48	0.36		0.18	<0.097
p,p'-DDE	4101	38	33.99773	-118.55968	0.3	0.12	<0.097		<0.097
p,p'-DDE	4134	78	33.82183	-118.4266	1.55	1.79		1.06	0.078
p,p'-DDE	4150	61	33.8769	-118.46972	<0.097	0.29		<0.097	0.068a
p,p'-DDE	4165	34	34.01375	-118.5918	0.23	<0.097	<0.097		<0.097
p,p'-DDE	4173	114	33.8781	-118.56803	0.12	0.39		0.49	
p,p'-DDE	4185	49	33.99118	-118.79765	0.27	0.35		0.13	<0.097
p,p'-DDE	4198	65	33.78893	-118.45607	2.58	2.08		0.8	0.082

a = Below reporting limits, but identifiable with GC/MS

Distribution through the water column

Zeng (1999) used a best fit through water column data sampled at depths of 1, 2, 5, 20, and 35 meters above the seafloor at site 6C (Table 2) to develop coefficients to define the exponential decline in concentrations above the seafloor. **Figure 2** shows an example of how those coefficients were used to calculate the vertical distribution of total DDE and PCBs through the water column at each volume-grid point. All concentrations higher in the water column are scaled relative to the predicted one meter above bottom concentration based on the sediment to water translator.

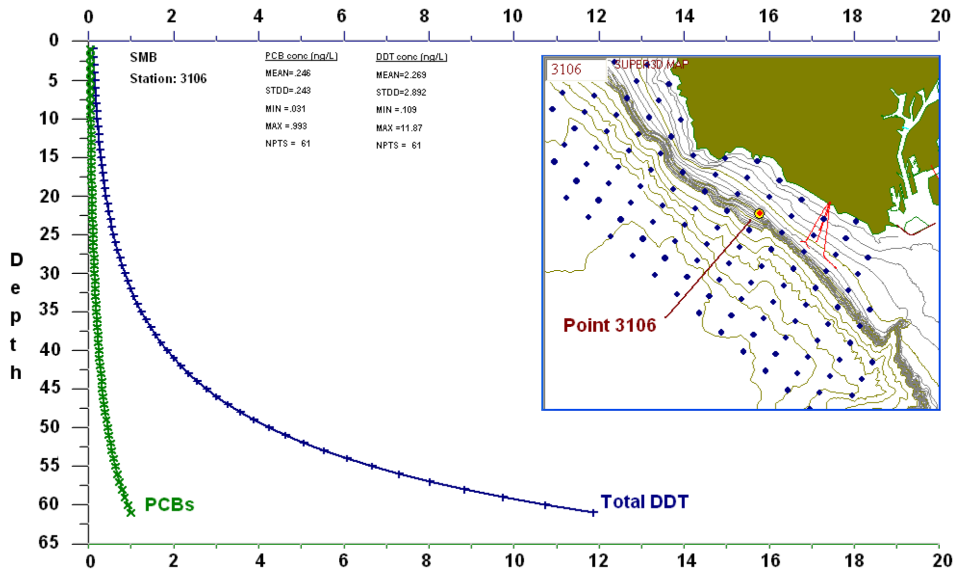

Figure 2 - Vertical profiles of DDT and PCBs concentration at a volume-grid point on the PV shelf

Surface sediment to water column translator

Since the water column data were limited in terms of spatial coverage and analytes, surface sediment to water column translators for DDT and PCBs were developed so the more robust sediment chemistry data could be used to estimate water column concentrations. Specifically, the 1996 surface sediment DDT data at the eight sites on the PV shelf were matched with the immediate overlying water column data as shown in **Table 4.** Similarly, 12 sites in SMB with surface sediment data from Bight'03 within 200 meters of the SPME deployments were identified and used to develop the translator.

Two minor adjustments were made to the data in Table 4 to increase consistency of the combined data set used to produce the surface sediment to water column translator. First, because Zeng (1999) reported that the PV shelf water column samples included between 71% and 78% p,p'-DDE, his total DDT results were reduced to 75% of measured values to approximate just the p,p'-DDE fraction. Second, Zeng (2005) only reported p,p'-DDE water column concentrations collected two meters above the bottom, compared with one meter above the bottom in Zeng (1999). Therefore, the two meter results were increased by 11%, based on the vertical water column distribution model provided by Zeng (1999), to provide an estimate of water column concentrations one meter above the bottom.

Table 4 – Surface sediment and water column data used for translator

Water Column Area - Study	Site	Water Column p,p'-DDE (ng/l)	Water Column PCB (ng/l)	Surface Sediment Study	Surface sediment p,p'-DDE (µg/kg)	Surface sediment Max. Aroclor (µg/kg)
PV - Zeng (1999)	0C	2.48	0.275	SanDist (1996)	670	104
PV - Zeng (1999)	3C	4.54	0.61	SanDist (1996)	2533	317
PV - Zeng (1999)	5C	7.35	0.825	SanDist (1996)	6500	740
PV - Zeng (1999)	6C	8.70	0.86	SanDist (1996)	9300	793
PV - Zeng (1999)	7C	5.78	0.605	SanDist (1996)	11000	1200
PV - Zeng (1999)	9C	3.86	0.305	SanDist (1996)	4500	500
PV - Zeng (1999)	6B	4.13	0.425	SanDist (1996)	18000	2200
PV - Zeng (1999)	6D	2.25	0.575	SanDist (1996)	680	88
SMB - Zeng (2005)	4006	1.04	NS	Bight'03	72.35	NS
SMB - Zeng (2005)	4021	0.54	NS	Bight'03	32.86	NS
SMB - Zeng (2005)	4037	0.46	NS	Bight'03	34.87	NS
SMB - Zeng (2005)	4086	1.73	NS	Bight'03	154	NS
SMB - Zeng (2005)	4089	0.54	NS	Bight'03	62.63	NS
SMB - Zeng (2005)	4101	0.34	NS	Bight'03	20.35	NS
SMB - Zeng (2005)	4134	1.74	NS	Bight'03	411	NS
SMB - Zeng (2005)	4150	0.05	NS	Bight'03	76.29	NS
SMB - Zeng (2005)	4165	0.26	NS	Bight'03	20.75	NS
SMB - Zeng (2005)	4173	0.13	NS	Bight'03	23.18	NS
SMB - Zeng (2005)	4185	0.3	NS	Bight'03	13.5	NS
SMB - Zeng (2005)	4198	2.9	NS	Bight'03	727	NS

NS = Not Sampled

The sediment surface p,p'-DDE data shown in Table 4 was plotted against the water column measurements and fit with a power curve as shown in **Figure 3**. Based upon this relationship, the one meter water column concentration of DDTs is calculated by the following formula:

*Water column conc. (ng/l) = 0.0605 * surface sediment conc. (µg/kg dry weight)*$^{0.5164}$

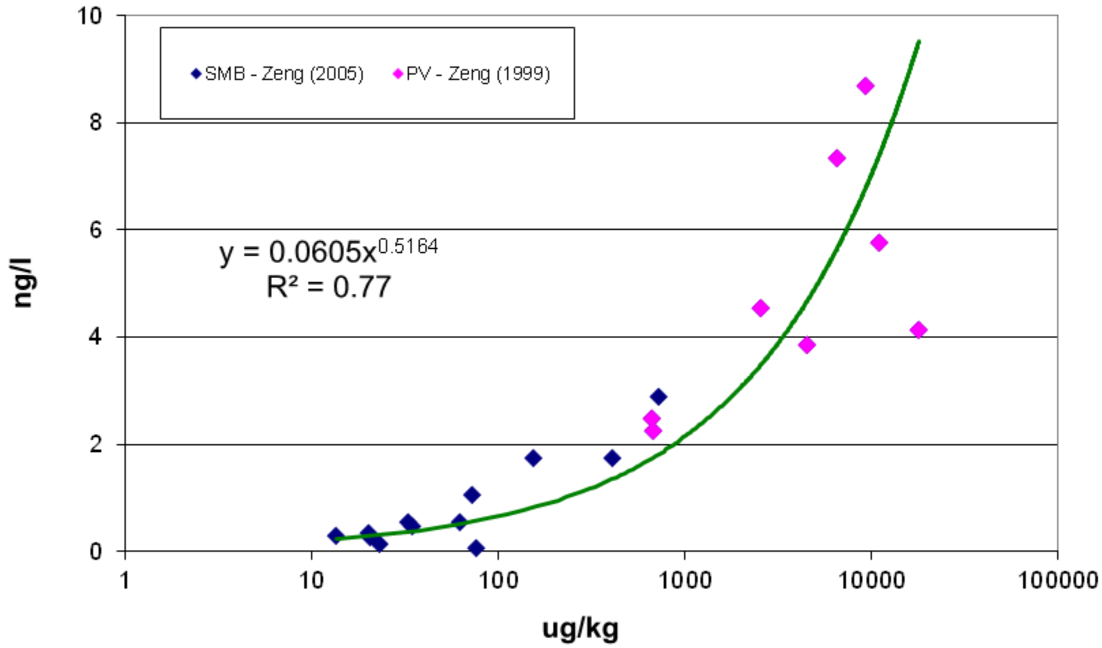

Figure 3 - p,p'-DDE measured in the water column at sites in SMB and PV plotted against the surface sediment concentrations measured directly below. A power curve defines the relationship.

The water column measurements of PCBs used to develop the PCB sediment to water translator were reported in Zeng (1999) and are also shown in Table 2. Table 4 shows the 1996 surface sediment maximum Aroclor value at each of these eight sites used to develop the translator (at least one Aroclor was detected at each of the eight sites). **Figure 4** shows a scatter plot and associated regression of this PCB data. The average, minimum and maximum ratio determined between surface sediments and the overlying water column, one meter above the bottom, are shown in the tabular area on the left side of Figure 3. Unlike the p,p'-DDE data, no clear trend was observed that could be modeled to calculate a site specific translator. Because the relationship was variable and not well correlated with sediment concentration, the translator was taken as the mean ratio for all eight sites (0.18%).

Total PCBs - July 1996

Site	Water Column Total PCBs (ng/l)	Sediment Surface peak aroclor (ug/kg)	Ratio
0C	0.275	104	0.26%
3C	0.61	317	0.19%
5C	0.825	740	0.11%
6C	0.86	793	0.11%
7C	0.605	1200	0.05%
9C	0.305	500	0.06%
6B	0.425	2200	0.02%
6D	0.575	88	0.65%
	Avg	743	0.18%
	StDev	698	0.21%
	Min	88	0.02%
	Max	2200	0.65%

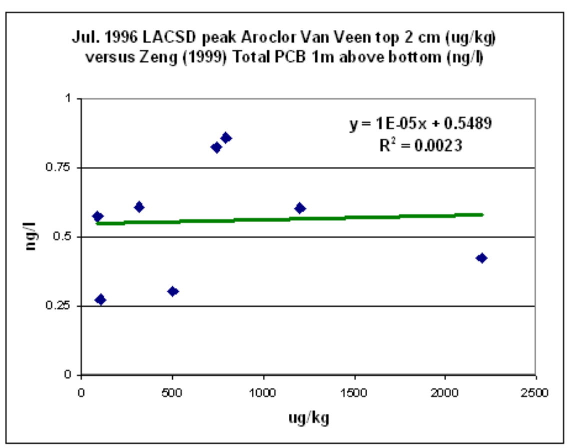

Figure 4 - Surface sediment to water column PCBs

The water column concentration of PCBs is calculated by the average ratio in Figure 3:

*Water column conc. (ng/l) = 0.0018 * surface sediment conc. (µg/kg dry weight)*

Calculations

The volume-grid points were processed by matching each with the geographically nearest sediment sampling point from the lookup table. The surface sediment concentrations from this nearest site were then used with the translator to estimate the one meter above seafloor water column concentration of DDTs and PCBs at the volume-grid point. Water depth at the volume-grid points was established with a bathymetry lookup table and knowing the depth, a concentration was calculated for each one meter interval from the seafloor to the surface at each volume-grid point using the Zeng (1999) water column distribution coefficients.

The grid point spacing was one kilometer on each line, and the spacing interval was equal between each of the 20 parallel lines of volume-grid points. Based on the horizontal spacing between volume-grid points a 'unit volume' was calculated. Summing all depths at all volume grid points and multiplying by the 'unit volume' produced a total volume for the area. Likewise, summing the predicted mass in each unit volume around all grid points gave a total mass. Average concentration was calculated by dividing the total estimated mass by the total volume.

Results

Table 5 summarizes the total water volume, and the predicted mass and average concentration of DDTs and PCBs for each of the modeled areas. For the total area of SMB with a volume of 327 km^3 the mass of DDTs and PCBs is estimated to be 12.8 kg and 2.98 kg, respectively, and average water column concentrations of DDTs and PCBs are 0.039 ng/l, and 0.009 ng/l, respectively. The SMB Ocean Boundary (area A in Figure 1), has an estimated volume of 178 km^3, and predicted water column masses of 3.15 kg DDTs and 0.66 kg PCBs, resulting in average water column concentrations of DDTs and PCBs of 0.018 ng/l and 0.004 ng/l, respectively. The SMB Receiver (area B in figure 1), with a volume of 36 km^3, has predicted water column masses of 1.26 kg DDTs and 0.30 kg PCBs, and average water column concentrations of DDTs and PCBs of 0.035 ng/l and 0.008 ng/l, respectively. The SMB Nearshore (area C in figure 1), with a volume of 46 km^3, has predicted water column masses of 2.67 kg DDTs and 0.745 kg PCBs, and average water column concentrations of DDTs and PCBs of 0.057 ng/l and 0.016 ng/l, respectively. The PV area, with a volume of 67 km^3, has predicted water column masses of 5.24 kg DDTs and 1.16 kg PCBs, and average water column concentrations of DDTs and PCBs of 0.078 ng/l and 0.017 ng/l, respectively.

Table 5 – Volume and predicted mass and average concentration of DDT and PCB for the different areas shown in Figure 1

	Area	Volume (km^3)	DDT (kg)	PCB (kg)	Average DDT conc (ng/l)	Average PCB conc (ng/l)
Total	SMB Total +PV	327	12.8	2.98	0.039	0.009
SMB Total	A+B+C	260	7.56	1.82	0.027	0.007
SMB Ocean Boundary	A	178	3.15	0.66	0.018	0.004
SMB Receiver	B	36	1.26	0.30	0.035	0.008
SMB Nearshore	C	46	2.67	0.745	0.057	0.016
PV Boundary	PV	67	5.24	1.16	0.078	0.017

Discussion

The development of SPME technology has allowed measurement of very low concentrations of DDT and PCB in the water column. Utilizing SPME devices on moorings suspended at a range of depths above the seafloor, Zeng (1999, 2006) found that low levels of DDTs and PCBs are commonly detected in the coastal ocean waters of the SCB. Using SPMEs at multiple depths on a mooring, the water column levels were shown to approximately exponentially decline with distance from the seafloor. Water column concentrations were also found to be significantly higher in the water above more contaminated sediments. These observations suggest that flux from contaminated sediments is an important process that contributes relatively large amounts of pollutants into the water. In fact Zeng (2005) estimated that 0.8 to 2.3 metric tons per year of p,p'-DDE are released in the entire Southern California Bight (SCB).

Zeng's studies only measured water column DDTs at 20 sites in the SMB and on the PV shelf, and PCBs at eight sites on the PV shelf. Because of the much greater density of available surface sediment measurements (209 sites in the area of SMB) it was beneficial to use this data as a starting point to estimate the total mass and average concentrations within the SMB rather than rely upon the work of Zeng for the entire area. By first utilizing Zeng's limited water column results, a power curve was found to fit well (R-squared value of 0.77) with surface sediment levels from the immediately adjacent sediments. The power curve relationship suggests that at higher sediment concentrations the DDT fluxes are exponentially greater than at lower concentrations. The power curve translator was developed with surface sediment concentrations ranging from 13.5 to 18,000 µg/kg, and water column concentrations ranging from 0.05 to 8.7 ng/l, and therefore encompassed a broad range of surface sediment levels of DDTs.

The only water column measurements of PCB concentrations were made at eight sites on the PV shelf in 1997. Correlations with surface sediment data were low. Nonetheless the average ratio between surface sediment and water column PCBs at these eight sites is felt to be a reasonable translator to estimate PCB water column concentrations. Also, like the DDTs, the PCBs in the surface sediments had a relatively wide range of concentration, from 88 to 2200 µg/kg.

Since the translators were developed using real data, it is not surprising that the estimated results with the sediment lookup approach are comparable to the preliminary results using just the original water column measurements. The additional benefit comes from the increased density and more complete coverage of the sediment sampling sites.

In deeper offshore areas the calculated vertical distributions of pollutants up into the water column, which are based on Zeng (1999) data at multiple depth points at a single site on the PV shelf, cause the water column more than 50 meters above the seafloor to be essentially free of pollutants. This result may be appropriate since limited direct surface sampling data in SMB found that at most locations surface waters did not have detectable DDTs. Since all the surface SPME deployments were made in relatively shallow water out to the shelf edge, but not over the shelf slope or basins, the fact that at a few locations the surface SPME samplers detected low levels of p,p'-DDE Zeng (2005), does not reduce the apparent strong correlation between water column concentrations and distance above the bottom. The SCB coastal ocean has relatively high density stratification throughout most of the year, which would also be expected to limit the upward diffusion of material. At the same time, the limited detection of DDT in surface waters of offshore SMB suggests that surface input from aerial deposition or runoff is relatively minor.

Between 1996 and 2010, the average surface sediment concentrations of DDTs and PCBs at the eight sites on the PV shelf where Zeng (1999) measured water column values in 1997 declined by 73% and 77%, respectively. If pollutant fluxes to the overlying water are concentration dependent, then it is likely that these fluxes are lower than when water column concentrations were measured in 1997. This also suggests that in using the average sediment concentrations for this time period, the estimated water column mass and concentrations are conservative. Applying the same translators, significant further reductions in water column concentrations are predicted when sediment levels attain the target levels in the EPA PV shelf remediation plan.

The reported estimates of water column concentrations of DDTs and PCBs are based upon limited direct measurements of water column concentrations in the areas of interest. Therefore, sediment to water translators were developed so a more comprehensive and spatially robust set of surface sediment chemistry data could be utilized for this analysis. Several assumptions were made in this process, which are discussed above. Despite these limitations, the results of this analysis are sufficient for the purpose of modeling the fate and transport of DDTs and PCBs and load allocations into the offshore environment.

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APPENDIX 1
Estimation of Santa Monica Bay Water Column Concentration of DDT and PCB

Surface sediment lookup table for SMB water column DDT and PCB mass and concentration estimation
Assembled from 1995-2008 Hyperion, Sanitation Districts and Bight'03 data

										Aroclor			Aroclor		Congener			Congener
Data Source	Site ID	Depth (m)	GIS-latitude	GIS-longitude	Q	**PPDDE (ug/kg)**	Q	sumDDT (1/2RL) (ug/kg)	Q	**maxPCB (ug/kg)**	Maximum PCBtype	Q	sumPCB (1/2RL) (ug/kg)	Q	maxPCB (ug/kg)	Maximum PCBtype	Q	**sumPCB (1/2RL) (ug/kg)**
Bight03	3001	106	33.36000	-118.31000		**0.62**	<	0.91		**NA**	NA		NA		ND	ND	<	**3.31**
Bight03	4005	830	33.93000	-118.90000		**34.00**	<	45.70		**NA**	NA		NA		ND	ND	<	**3.31**
Bight03	4006	60	33.86000	-118.45000		**72.35**	<	86.68		**NA**	NA		NA		ND	ND	<	**150.00**
Bight03	4010	4	33.77000	-118.25000		**52.41**	<	84.85		**NA**	NA		NA		16.72	PCB153/168	<	**203.37**
Bight03	4021	36	33.93000	-118.48000		**32.86**	<	39.13		**NA**	NA		NA		1.42	PCB110	<	**145.15**
Bight03	4022	62	33.87000	-118.52000		**51.78**	<	59.68		**NA**	NA		NA		2.47	PCB110	<	**146.60**
Bight03	4037	60	34.00000	-118.71000		**34.87**	<	40.99		**NA**	NA		NA		ND	ND	<	**150.00**
Bight03	4038	131	33.77000	-118.46000		**1070.00**		1409.60		**NA**	NA		NA		10.4	PCB37	<	**136.55**
Bight03	4042	28	33.70000	-118.30000		**256.00**		317.10		**NA**	NA		NA		2.8	PCB66	<	**83.05**
Bight03	4045	58	33.93000	-118.54000		**18.13**	<	22.15		**NA**	NA		NA		1.9	PCB118	<	**138.38**
Bight03	4050	26	33.72000	-118.26000		**89.27**	<	108.30		**NA**	NA		NA		2.12	PCB110	<	**148.37**
Bight03	4053	1.5	33.97000	-118.44000		**17.29**	<	29.79		**NA**	NA		NA		ND	ND	<	**100.00**
Bight03	4057	140	33.98000	-118.63000		**61.21**	<	69.90		**NA**	NA		NA		2.64	PCB110	<	**141.87**
Bight03	4070	72	33.76000	-118.45000		**1140.00**		1368.00		**NA**	NA		NA		13.8	PCB37	<	**173.90**
Bight03	4074	650	33.58000	-118.33000		**27.00**	<	65.15		**NA**	NA		NA		1.2	PCB153	<	**4.41**
Bight03	4077	57	33.92000	-118.52000		**28.00**	<	35.02		**NA**	NA		NA		2.31	PCB110	<	**144.67**
Bight03	4085	6.5	33.96000	-118.45000		**11.10**	<	24.60		**NA**	NA		NA		5.09	PCB153	<	**105.08**
Bight03	4086	94	33.83000	-118.47000		**154.32**	<	181.37		**NA**	NA		NA		2.73	PCB110	<	**146.86**
Bight03	4089	83	33.85000	-118.57000		**62.63**	<	73.44		**NA**	NA		NA		1.41	PCB110	<	**147.66**
Bight03	4101	38	34.00000	-118.56000		**20.35**	<	25.34		**NA**	NA		NA		ND	ND	<	**150.00**
Bight03	4102	42	33.72000	-118.36000		**1210.00**	<	1660.40		**NA**	NA		NA		9.3	PCB37	<	**163.05**
Bight03	4106	600	33.63000	-118.30000		**78.00**	<	129.05		**NA**	NA		NA		5	PCB52	<	**10.88**
Bight03	4109	45	33.96000	-118.52000		**36.27**	<	43.17		**NA**	NA		NA		1.43	PCB110	<	**145.19**
Bight03	4117	4.8	33.98000	-118.44000		**10.69**	<	23.48		**NA**	NA		NA		7.19	PCB138	<	**107.18**
Bight03	4124	700	33.47000	-118.39000		**6.30**	<	10.60		**NA**	NA		NA		ND	ND	<	**3.31**
Bight03	4134	78	33.82000	-118.43000		**411.00**	<	479.20		**NA**	NA		NA		5.2	PCB138	<	**102.50**
Bight03	4138	11	33.72000	-118.28000		**137.70**	<	162.69		**NA**	NA		NA		10.34	PCB110	<	**164.38**
Bight03	4141	58	33.92000	-118.53000		**24.43**	<	29.38		**NA**	NA		NA		2.04	PCB118	<	**143.93**
Bight03	4149	6	33.96000	-118.46000		**45.79**	<	58.29		**NA**	NA		NA		ND	ND	<	**100.00**
Bight03	4150	61	33.88000	-118.47000		**76.29**	<	90.59		**NA**	NA		NA		1.68	PCB110	<	**147.93**
Bight03	4153	750	33.83000	-118.65000		**32.00**	<	43.95		**NA**	NA		NA		ND	ND	<	**3.31**
Bight03	4165	34	34.01000	-118.59000		**20.75**	<	25.82		**NA**	NA		NA		ND	ND	<	**150.00**
Bight03	4166	67	33.71000	-118.36000		**3010.00**		678.20		**NA**	NA		NA		61.4	PCB37	<	**333.15**
Bight03	4170	25	33.70000	-118.30000		**220.00**	<	554.40		**NA**	NA		NA		2.6	PCB66	<	**102.45**
Bight03	4173	114	33.91000	-118.57000		**23.18**	<	3.31		**NA**	NA		NA		ND	ND	<	**150.00**
Bight03	4178	19	33.71000	-118.26000		**100.95**	<	121.00		**NA**	NA		NA		ND	ND	<	**150.00**
Bight03	4181	15	34.00000	-118.51000		**1.27**	<	3.77		**NA**	NA		NA		ND	ND	<	**150.00**
Bight03	4185	49	33.99000	-118.80000		**13.50**	<	18.19		**NA**	NA		NA		ND	ND	<	**150.00**
Bight03	4188	900	33.49000	-118.43000		**12.00**	<	33.80		**NA**	NA		NA		ND	ND	<	**3.31**
Bight03	4197	1.3	34.03000	-118.68000	<	**2.50**	<	15.00		**NA**	NA		NA		ND	ND	<	**100.00**
Bight03	4198	65	33.79000	-118.46000		**727.00**		882.30		**NA**	NA		NA		7.9	PCB138	<	**120.65**
Bight03	4202	279	33.69000	-118.35000		**1860.00**		2301.30		**NA**	NA		NA		15	PCB66	<	**216.40**
Bight03	4205	68	33.93000	-118.54000		**44.62**	<	50.90		**NA**	NA		NA		7.96	PCB118	<	**146.33**
Bight03	4213	1	33.97000	-118.44000	<	**2.50**	<	13.89		**NA**	NA		NA		ND	ND	<	**100.00**
Bight03	4230	55	33.90000	-118.50000		**57.77**	<	67.13		**NA**	NA		NA		2.6	PCB110	<	**144.50**
Bight03	4234	34	33.67000	-118.26000		**14.40**	<	19.50		**NA**	NA		NA		0.3	PCB138	<	**132.55**
Bight03	4252	700	33.62000	-118.72000		**4.70**	<	10.65		**NA**	NA		NA		ND	ND	<	**3.31**
Bight03	4262	10	33.84000	-118.40000		**37.70**	<	9.00		**NA**	NA		NA		6.1	PCB138	<	**97.35**

Surface sediment lookup table for SMB water column DDT and PCB mass and concentration estimation
Assembled from 1995-2008 Hyperion, Sanitation Districts and Bight'03 data

										Aroclor			Aroclor		Congener			Congener
Data Source	Site ID	Depth (m)	GIS-latitude	GIS-longitude	Q	**PPDDE (ug/kg)**	Q	sumDDT (1/2RL) (ug/kg)	Q	**maxPCB (ug/kg)**	Maximum PCBtype	Q	sumPCB (1/2RL) (ug/kg)	Q	maxPCB (ug/kg)	Maximum PCBtype	Q	**sumPCB (1/2RL) (ug/kg)**
Bight03	4266	14	33.77000	-118.28000		**25.09**	<	27.59		**NA**	NA		NA		13.74	PCB101	<	**180.32**
Bight03	4269	160	33.96000	-118.59000		**128.87**	<	147.80		**NA**	NA		NA		16.59	PCB118	<	**192.38**
Bight03	4277	52	33.91000	-118.50000		**61.13**	<	71.30		**NA**	NA		NA		2.67	PCB110	<	**144.56**
Bight03	4278	65	33.88000	-118.54000		**56.30**	<	64.46		**NA**	NA		NA		2.09	PCB110	<	**145.87**
Bight03	4294	25	33.74000	-118.41000		**57.60**	<	72.90		**NA**	NA		NA		0.8	PCB66	<	**100.75**
Bight03	4298	628	33.64000	-118.31000		**12.00**	<	16.15		**NA**	NA		NA		ND	ND	<	**3.31**
Bight03	4301	61	33.90000	-118.54000		**9.87**	<	13.19		**NA**	NA		NA		ND	ND	<	**150.00**
Bight03	4309	15	33.98000	-118.49000		**1.98**	<	4.48		**NA**	NA		NA		ND	ND	<	**150.00**
Bight03	4326	41	33.74000	-118.42000		**500.00**		96.10		**NA**	NA		NA		7	PCB66	<	**112.93**
Bight03	4330	63	33.62000	-118.26000		**17.10**	<	21.90		**NA**	NA		NA		0.7	PCB110	<	**117.70**
Bight03	4341	5.2	33.97000	-118.45000		**3.09**	<	15.59		**NA**	NA		NA		ND	ND	<	**100.00**
Bight03	4345	850	33.91000	-118.82000		**7.20**	<	9.15		**NA**	NA		NA		ND	ND	<	**3.31**
Bight03	4358	52	33.88000	-118.54000		**9.57**	<	2.25		**NA**	NA		NA		ND	ND	<	**150.00**
Bight03	4362	51	33.64000	-118.25000		**43.80**	<	53.50		**NA**	NA		NA		0.9	PCB138	<	**94.45**
Bight03	4365	48	33.96000	-118.53000		**29.47**	<	36.60		**NA**	NA		NA		1.29	PCB110	<	**147.54**
Bight03	4380	894	33.61000	-118.59000		**16.00**		109.70		**NA**	NA		NA		ND	ND	<	**3.31**
Bight03	4392	610	33.58000	-118.75000		**1.39**	<	61.09		**NA**	NA		NA		ND	ND	<	**100.00**
Bight03	4683	0.8	34.03000	-118.68000		**1.20**	<	1.49		**NA**	NA		NA		ND	ND	<	**3.31**
Bight03	4939	1.3	34.03000	-118.68000	<	**2.50**	<	15.00		**NA**	NA		NA		ND	ND	<	**100.00**
Bight03	5735	3	33.97000	-118.45000		**3.30**	<	9.68		**NA**	NA		NA		5.2	PCB18	<	**13.36**
Bight03	5739	0.8	34.03000	-118.68000		**0.38**	<	0.17		**NA**	NA		NA		ND	ND	<	**3.31**
Bight03	5767	3.5	33.97000	-118.45000		**4.70**	<	10.66		**NA**	NA		NA		1.6	PCB138	<	**13.43**
Bight03	5771	0.8	34.03000	-118.68000	<	**0.06**	<	0.34		**NA**	NA		NA		ND	ND	<	**3.31**
Bight03	5787	2.5	33.96000	-118.46000		**1.50**	<	3.93		**NA**	NA		NA		1.6	PCB101	<	**11.18**
Bight03	BRI-01	5	33.98000	-118.46000		**8.89**	<	21.39		**NA**	NA		NA		6.19	PCB170	<	**100.25**
Bight03	BRI-02	4.5	33.98000	-118.46000		**2.20**	<	14.70		**NA**	NA		NA		ND	ND	<	**100.00**
Bight03	BRI-03	7	33.74000	-118.27000		**10.80**	<	23.30		**NA**	NA		NA		2.9	PCB180	<	**100.10**
Bight03	BRI-04	12	33.77000	-118.25000	<	**2.50**	<	15.00		**NA**	NA		NA		ND	ND	<	**100.00**
LACity	A1		33.98639	-118.50194	<	**1.12**	<	3.40	<	**7.48**	AROCLOR 1232	<	38.44		NA	NA		**NA**
LACity	A2		33.91861	-118.44806	<	**9.83**	<	13.80	<	**10.33**	AROCLOR 1254	<	41.96		NA	NA		**NA**
LACity	A3		33.86750	-118.41667	<	**2.02**	<	4.18	<	**7.48**	AROCLOR 1232	<	36.64		NA	NA		**NA**
LACity	B1		34.00694	-118.71556	<	**20.07**	<	27.79	<	**14.36**	AROCLOR 1254	<	45.99		NA	NA		**NA**
LACity	B10		33.84139	-118.41567		**88.26**	<	111.04	<	**19.11**	AROCLOR 1254	<	58.50		NA	NA		**NA**
LACity	B2		34.01194	-118.64667		**21.65**	<	33.99	<	**10.00**	AROCLOR 1232	<	45.00		NA	NA		**NA**
LACity	B3		34.00583	-118.59722		**26.76**	<	32.66	<	**10.79**	AROCLOR 1254	<	42.42		NA	NA		**NA**
LACity	B4		33.99639	-118.55000		**16.55**	<	20.88	=	**17.45**	AROCLOR 1254	<	57.45		NA	NA		**NA**
LACity	B5		33.96639	-118.52556		**30.23**	<	36.28	<	**11.02**	AROCLOR 1260	<	47.78		NA	NA		**NA**
LACity	B6		33.94111	-118.50944		**36.03**	<	46.73	<	**12.14**	AROCLOR 1254	<	45.19		NA	NA		**NA**
LACity	B7		33.92139	-118.49167		**52.83**	<	68.08	<	**14.14**	AROCLOR 1254	<	47.66		NA	NA		**NA**
LACity	B8		33.89667	-118.47417		**44.61**	<	54.19	<	**10.03**	AROCLOR 1254	<	42.65		NA	NA		**NA**
LACity	B9		33.87917	-118.45667		**44.95**	<	54.07	=	**26.25**	AROCLOR 1254	<	66.25		NA	NA		**NA**
LACity	C1		33.99722	-118.71750		**33.73**	<	49.34	<	**14.83**	AROCLOR 1254	<	52.17	<	3	PCB18	<	**20.38**
LACity	C10		33.84806	-118.41778		**122.50**	<	148.29	=	**59.40**	AROCLOR 1254	<	123.65		NA	NA		**NA**
LACity	C2		33.99778	-118.64861		**36.25**	<	43.36	=	**26.60**	AROCLOR 1254	<	66.60		NA	NA		**NA**
LACity	C3		33.98972	-118.60056		**30.51**	<	46.62	<	**15.93**	AROCLOR 1254	<	56.82	=	3.25	PCB118	<	**26.36**
LACity	C4		33.97139	-118.56472		**22.60**	<	30.29	<	**29.80**	AROCLOR 1254	<	62.04		NA	NA		**NA**
LACity	C5		33.95278	-118.55389		**19.19**	<	22.84	<	**17.23**	AROCLOR 1254	<	53.85		NA	NA		**NA**
LACity	C6		33.92806	-118.53472		**20.12**	<	32.25	<	**17.29**	AROCLOR 1254	<	56.17	=	3.37	PCB66	<	**24.47**
LACity	C7		33.89306	-118.53750		**15.32**	<	24.59	<	**11.79**	AROCLOR 1254	<	50.01	=	3	PCB138	<	**26.50**
LACity	C8		33.87917	-118.52361	<	**22.68**	<	35.21	<	**11.01**	AROCLOR 1254	<	49.26	=	4.76	PCB99	<	**24.87**
LACity	C9A		33.85472	-118.43806	<	**48.02**	<	64.18	<	**17.19**	AROCLOR 1254	<	57.04	<	3	PCB18	<	**19.40**

Surface sediment lookup table for SMB water column DDT and PCB mass and concentration estimation
Assembled from 1995-2008 Hyperion, Sanitation Districts and Bight'03 data

										Aroclor			Aroclor		Congener			Congener
Data Source	Site ID	Depth (m)	GIS-latitude	GIS-longitude	Q	**PPDDE (ug/kg)**	Q	sumDDT (1/2RL) (ug/kg)	Q	**maxPCB (ug/kg)**	Maximum PCBtype	Q	sumPCB (1/2RL) (ug/kg)	Q	maxPCB (ug/kg)	Maximum PCBtype	Q	**sumPCB (1/2RL) (ug/kg)**
LACity	D1		33.91167	-118.55000		**31.88**	<	43.84	<	**19.54**	AROCLOR 1254	<	58.74	=	3.03	PCB118	<	**22.86**
LACity	D2		33.91111	-118.58833		**232.00**	<	248.81	<	**26.60**	AROCLOR 1254	<	73.45		NA	NA		**NA**
LACity	D3		33.86306	-118.58750		**306.50**	<	330.60	<	**16.20**	AROCLOR 1260	<	53.70		NA	NA		**NA**
LACity	D4		33.85194	-118.52500		**52.15**	<	58.24	<	**19.40**	AROCLOR 1254	<	65.65		NA	NA		**NA**
LACity	D5		33.84861	-118.48028		**334.00**	<	348.60	<	**22.05**	AROCLOR 1254	<	62.05		NA	NA		**NA**
LACity	E1		33.98428	-118.71444	<	**34.86**	<	42.24	<	**12.31**	AROCLOR 1260	<	48.91		NA	NA		**NA**
LACity	E10		33.82342	-118.46467		**169.43**	<	199.68	<	**14.54**	AROCLOR 1254	<	46.18		NA	NA		**NA**
LACity	E2		33.97778	-118.65444		**54.50**	<	68.68	<	**14.65**	AROCLOR 1254	<	54.65		NA	NA		**NA**
LACity	E3		33.97194	-118.61444		**60.10**	<	71.94	<	**17.61**	AROCLOR 1254	<	56.06		NA	NA		**NA**
LACity	E4		33.95639	-118.59028		**61.80**	<	77.98	=	**106.50**	AROCLOR 1254	<	218.50		NA	NA		**NA**
LACity	E5		33.94222	-118.57500		**64.45**	<	79.49	=	**100.00**	AROCLOR 1260	<	167.30		NA	NA		**NA**
LACity	E6		33.92833	-118.55694	<	**64.18**	<	119.87	<	**122.90**	AROCLOR 1254	<	230.88	=	18	PCB138	<	**111.99**
LACity	E6A		33.92833	-118.55694		**55.40**	<	60.73	=	**138.00**	AROCLOR 1254	<	257.90		NA	NA		**NA**
LACity	E7		33.91222	-118.57139		**59.25**	<	64.76	=	**57.80**	AROCLOR 1254	<	105.70		NA	NA		**NA**
LACity	E8		33.90500	-118.60639		**71.65**	<	76.26	<	**23.15**	AROCLOR 1254	<	70.75		NA	NA		**NA**
LACity	E9		33.82306	-118.51722		**398.50**	<	464.97	=	**92.25**	AROCLOR 1254	<	132.25		NA	NA		**NA**
LACity	FA10		33.88554	-118.51639		**19.10**	<	26.17	<	**14.45**	AROCLOR 1254	<	54.45		NA	NA		**NA**
LACity	FA11		33.89323	-118.50175		**34.15**	<	44.81	<	**18.00**	AROCLOR 1254	<	58.00		NA	NA		**NA**
LACity	FA12		33.89784	-118.49064		**52.45**	<	65.25	<	**22.80**	AROCLOR 1254	<	62.80		NA	NA		**NA**
LACity	FA13		33.90664	-118.56883		**15.80**	<	19.95	<	**10.60**	AROCLOR 1254	<	50.60		NA	NA		**NA**
LACity	FA14		33.91456	-118.47670		**36.95**	<	49.28	<	**50.00**	AROCLOR 1254	<	90.00		NA	NA		**NA**
LACity	FA15		33.91789	-118.55645		**35.75**	<	46.22	<	**40.95**	AROCLOR 1254	<	80.95		NA	NA		**NA**
LACity	FA16		33.93277	-118.50083		**57.25**	<	80.02	<	**42.85**	AROCLOR 1254	<	82.85		NA	NA		**NA**
LACity	FA17		33.93476	-118.55347		**11.74**	<	18.06	<	**16.15**	AROCLOR 1254	<	56.15		NA	NA		**NA**
LACity	FA18		33.94353	-118.48918		**16.75**	<	22.64	<	**14.10**	AROCLOR 1254	<	54.10		NA	NA		**NA**
LACity	FA19		33.94451	-118.53611		**16.70**	<	24.44	<	**15.40**	AROCLOR 1254	<	55.40		NA	NA		**NA**
LACity	FA20		33.95262	-118.52450		**24.95**	<	34.88	<	**15.65**	AROCLOR 1254	<	55.65		NA	NA		**NA**
LACity	FA7		33.87329	-118.49729		**70.90**	<	80.04	<	**30.15**	AROCLOR 1254	<	70.15		NA	NA		**NA**
LACity	FA8		33.87791	-118.54417	<	**13.40**	<	44.40	<	**20.75**	AROCLOR 1260	<	68.30		NA	NA		**NA**
LACity	FA9		33.88302	-118.48772		**68.95**	<	80.55	<	**32.25**	AROCLOR 1260	<	87.45		NA	NA		**NA**
LACity	FB10		33.88361	-118.49756		**55.07**	<	71.38	<	**13.50**	AROCLOR 1254	<	33.98		NA	NA		**NA**
LACity	FB11		33.88478	-118.55318		**83.47**	<	105.61	<	**54.67**	AROCLOR 1254	<	75.15		NA	NA		**NA**
LACity	FB12		33.88748	-118.51265		**38.43**	<	42.55	<	**5.00**	AROCLOR 1254	<	25.48		NA	NA		**NA**
LACity	FB13		33.88804	-118.48359		**75.50**	<	89.10	<	**16.50**	AROCLOR 1254	<	36.98		NA	NA		**NA**
LACity	FB14		33.89360	-118.56500		**61.53**	<	78.06	<	**35.77**	AROCLOR 1254	<	56.25		NA	NA		**NA**
LACity	FB15		33.90323	-118.48069		**68.13**	<	82.29	<	**21.17**	AROCLOR 1254	<	41.65		NA	NA		**NA**
LACity	FB16		33.91836	-118.48959		**31.52**	<	37.77	<	**5.00**	AROCLOR 1254	<	25.48		NA	NA		**NA**
LACity	FB17		33.93700	-118.56375		**31.97**	<	40.53	<	**27.83**	AROCLOR 1254	<	57.98		NA	NA		**NA**
LACity	FB18		33.94012	-118.48718		**28.80**	<	37.73	<	**18.20**	AROCLOR 1254	<	38.68		NA	NA		**NA**
LACity	FB19		33.94483	-118.53119		**26.70**	<	30.15	<	**15.72**	AROCLOR 1260	<	37.48		NA	NA		**NA**
LACity	FB20		33.94763	-118.50479		**31.40**	<	41.31	<	**17.13**	AROCLOR 1254	<	37.62		NA	NA		**NA**
LACity	FB9		33.87488	-118.51841		**61.63**	<	79.97	<	**25.05**	AROCLOR 1260	<	64.68		NA	NA		**NA**
LACity	HR1		33.92933	-118.54717		**30.50**	<	34.62	=	**90.30**	AROCLOR 1254	<	181.90		NA	NA		**NA**
LACity	HR2		33.93183	-118.55133		**10.30**	<	12.29	=	**22.60**	AROCLOR 1254	<	62.60		NA	NA		**NA**
LACity	HR50		33.92767	-118.55350		**76.70**	<	89.97	=	**240.00**	AROCLOR 1254	<	394.30		NA	NA		**NA**
LACity	HR50A		33.92767	-118.55350		**60.20**	<	65.29	=	**153.00**	AROCLOR 1254	<	316.50		NA	NA		**NA**
LACity	HR50B		33.92767	-118.55350		**79.10**	<	87.28	=	**208.00**	AROCLOR 1254	<	454.80		NA	NA		**NA**
LACity	HR51		33.92350	-118.55517		**142.00**	<	143.50	=	**381.00**	AROCLOR 1254	<	612.20		NA	NA		**NA**
LACity	HR51A		33.92350	-118.55517		**129.00**	<	130.50	=	**393.00**	AROCLOR 1254	<	644.00		NA	NA		**NA**
LACity	HR51B		33.92350	-118.55517		**170.00**	<	184.70	=	**170.00**	AROCLOR 1242	<	351.00		NA	NA		**NA**
LACity	NA1		33.88993	-118.51983	<	**8.00**	<	11.38	<	**10.00**	AROCLOR 1232	<	45.00		NA	NA		**NA**

Surface sediment lookup table for SMB water column DDT and PCB mass and concentration estimation
Assembled from 1995-2008 Hyperion, Sanitation Districts and Bight'03 data

										Aroclor			Aroclor		Congener			Congener
Data Source	Site ID	Depth (m)	GIS-latitude	GIS-longitude	Q	**PPDDE (ug/kg)**	Q	sumDDT (1/2RL) (ug/kg)	Q	**maxPCB (ug/kg)**	Maximum PCBtype	Q	sumPCB (1/2RL) (ug/kg)	Q	maxPCB (ug/kg)	Maximum PCBtype	Q	**sumPCB (1/2RL) (ug/kg)**
LACity	NA2		33.90090	-118.51511		**26.40**	<	45.95	<	**25.00**	AROCLOR 1254	<	65.00		NA	NA		**NA**
LACity	NA3		33.90332	-118.53375		**13.60**	<	20.88	<	**20.75**	AROCLOR 1254	<	60.75		NA	NA		**NA**
LACity	NA4		33.91768	-118.50634		**46.25**	<	63.18	<	**25.40**	AROCLOR 1254	<	65.40		NA	NA		**NA**
LACity	NA5		33.91945	-118.51856		**27.45**	<	42.30	<	**21.10**	AROCLOR 1254	<	61.10		NA	NA		**NA**
LACity	NA6		33.93401	-118.52726		**22.80**	<	37.71	<	**17.40**	AROCLOR 1254	<	57.40		NA	NA		**NA**
LACity	NB1		33.90542	-118.55036		**30.40**	<	37.13	<	**5.00**	AROCLOR 1254	<	25.48		NA	NA		**NA**
LACity	NB2		33.90816	-118.50175		**50.50**	<	58.09	<	**20.63**	AROCLOR 1254	<	41.12		NA	NA		**NA**
LACity	NB3		33.91471	-118.53428		**39.00**	<	49.40	<	**54.63**	AROCLOR 1254	<	75.12		NA	NA		**NA**
LACity	NB4		33.91509	-118.50990		**39.23**	<	46.58	<	**23.50**	AROCLOR 1254	<	43.98		NA	NA		**NA**
LACity	NB5		33.92101	-118.54969		**12.07**	<	15.55	<	**5.00**	AROCLOR 1254	<	25.48		NA	NA		**NA**
LACity	NB6		33.92700	-118.49814		**46.90**	<	57.47	<	**14.83**	AROCLOR 1254	<	35.32		NA	NA		**NA**
LACity	NB7		33.92783	-118.53145		**21.30**	<	26.86	<	**17.80**	AROCLOR 1254	<	38.28		NA	NA		**NA**
LACity	NB8		33.93687	-118.51377		**33.30**	<	39.88	<	**25.30**	AROCLOR 1254	<	45.78		NA	NA		**NA**
LACity	Z1		33.91472	-118.52500		**30.59**	<	35.95	<	**31.99**	AROCLOR 1254	<	63.62		NA	NA		**NA**
LACity	Z2		33.90750	-118.52444		**17.87**	<	28.57	<	**18.98**	AROCLOR 1254	<	60.90	=	3.12	PCB66	<	**20.29**
LACSD	0A		33.81830	-118.45420		**757.60**	<	1085.32	<	**137.50**	AROCLOR 1254	<	517.88		NA	NA		**NA**
LACSD	0B		33.81170	-118.44170		**773.75**	<	1018.63	<	**117.45**	AROCLOR 1254	<	915.30		58.8	PCB CONGENER 101	<	**395.25**
LACSD	0C		33.80720	-118.43050		**637.14**	<	798.74	<	**87.88**	AROCLOR 1254	<	640.97	<	12.4	PCB CONGENER 101	<	**248.73**
LACSD	0D		33.80280	-118.42270		**194.00**	<	257.80	<	**50.00**	AROCLOR 1221	<	491.75	<	11.4	PCB CONGENER 101	<	**230.97**
LACSD	10A		33.65770	-118.30130		**618.40**	<	1018.19	<	**84.78**	AROCLOR 1254	<	353.95		NA	NA		**NA**
LACSD	10B		33.66220	-118.29830		**548.80**	<	907.26	<	**65.41**	AROCLOR 1254	<	308.13		NA	NA		**NA**
LACSD	10C		33.66850	-118.29680		**447.00**		737.35	<	**59.75**	AROCLOR 1221	<	268.00		NA	NA		**NA**
LACSD	10D		33.69330	-118.28900		**352.80**	<	593.02	<	**60.50**	AROCLOR 1221	<	269.65		NA	NA		**NA**
LACSD	1A		33.74530	-118.44980		**4816.20**	<	7219.72		**537.00**	AROCLOR 1254	<	1093.00		NA	NA		**NA**
LACSD	1B		33.74950	-118.44680		**1215.11**	<	1682.94		**189.60**	AROCLOR 1254	<	902.93		17	PCB CONGENER 101	<	**261.17**
LACSD	1C		33.75730	-118.44100		**1592.23**	<	2141.10		**218.00**	AROCLOR 1254	<	808.31		24.5	PCB CONGENER 101	<	**283.38**
LACSD	1D		33.76500	-118.43530		**303.28**	<	399.55	<	**64.00**	AROCLOR 1221	<	376.80	<	10.7	PCB CONGENER 101	<	**213.20**
LACSD	2A		33.72700	-118.42870		**1690.80**	<	2511.90		**184.75**	AROCLOR 1254	<	498.35		NA	NA		**NA**
LACSD	2B		33.73250	-118.42580		**1631.00**	<	2408.52		**178.75**	AROCLOR 1254	<	464.60		NA	NA		**NA**
LACSD	2C		33.73770	-118.42320		**1841.60**	<	2594.32		**202.75**	AROCLOR 1254	<	625.83		NA	NA		**NA**
LACSD	2D		33.74120	-118.42130		**222.58**	<	316.78	<	**54.63**	AROCLOR 1221	<	238.50		NA	NA		**NA**
LACSD	3A		33.71900	-118.41100		**3724.00**	<	5534.71		**379.75**	AROCLOR 1254	<	842.34		NA	NA		**NA**
LACSD	3B		33.72380	-118.40730		**2808.89**	<	3806.87		**331.36**	AROCLOR 1254	<	2760.40		40.1	PCB CONGENER 101	<	**340.40**
LACSD	3C		33.73000	-118.40250		**2000.60**	<	2600.20		**275.24**	AROCLOR 1254	<	1750.62		32	PCB CONGENER 101	<	**309.28**
LACSD	3D		33.73320	-118.40050		**433.78**	<	564.37	<	**142.50**	AROCLOR 1254	<	1304.40	<	11.7	PCB CONGENER 101	<	**228.23**
LACSD	4A		33.71170	-118.38970		**5295.60**	<	7987.51		**457.25**	AROCLOR 1254	<	974.25		NA	NA		**NA**
LACSD	4B		33.71670	-118.38730		**7306.80**	<	10914.25		**704.50**	AROCLOR 1254	<	1398.75		NA	NA		**NA**
LACSD	4C		33.72330	-118.38470		**3390.80**	<	4942.03		**350.00**	AROCLOR 1254	<	926.50		NA	NA		**NA**
LACSD	4D		33.73180	-118.38050		**617.40**	<	1046.64	<	**106.75**	AROCLOR 1254	<	359.21		NA	NA		**NA**
LACSD	5A		33.70100	-118.37130		**3760.00**	<	6130.58		**326.75**	AROCLOR 1254	<	684.05		NA	NA		**NA**
LACSD	5B		33.70900	-118.36800		**6653.00**	<	9045.03		**873.75**	AROCLOR 1254	<	3227.25		71.9	PCB CONGENER 66	<	**652.45**
LACSD	5C		33.71470	-118.36600		**3232.50**	<	4447.39		**505.75**	AROCLOR 1254	<	3269.00		37.8	PCB CONGENER 66	<	**377.27**
LACSD	5D		33.72230	-118.36320		**386.00**	<	522.33	<	**62.50**	AROCLOR 1221	<	382.40	<	12.2	PCB CONGENER 101	<	**236.43**
LACSD	6A		33.69980	-118.35930		**6167.00**	<	9123.84		**510.50**	AROCLOR 1254	<	1063.43		NA	NA		**NA**
LACSD	6B		33.70300	-118.35580		**9006.67**	<	12376.83	<	**1185.30**	AROCLOR 1254	<	11121.00		54.9	PCB CONGENER 66	<	**599.68**
LACSD	6C		33.70780	-118.35400		**5999.23**	<	8018.78	<	**530.61**	AROCLOR 1254	<	1938.76		39	PCB CONGENER 66	<	**393.58**
LACSD	6D		33.71630	-118.34850		**403.89**	<	552.36	<	**62.24**	AROCLOR 1254	<	847.50	<	11.5	PCB CONGENER 101	<	**224.13**
LACSD	7A		33.69770	-118.35320		**1848.00**	<	2758.32		**176.50**	AROCLOR 1254	<	499.54		NA	NA		**NA**
LACSD	7B		33.70080	-118.35150		**9362.50**	<	14215.08	<	**988.88**	AROCLOR 1254	<	4325.50		215	PCB CONGENER 66	<	**1811.07**
LACSD	7C		33.70520	-118.34870		**5170.00**	<	7504.60	<	**441.63**	AROCLOR 1254	<	3333.05		33.4	PCB CONGENER 70	<	**279.97**
LACSD	7D		33.71270	-118.34350		**429.38**	<	610.41	<	**61.50**	AROCLOR 1221	<	387.40	<	10.7	PCB CONGENER 101	<	**215.93**

Surface sediment lookup table for SMB water column DDT and PCB mass and concentration estimation
Assembled from 1995-2008 Hyperion, Sanitation Districts and Bight'03 data

										Aroclor			Aroclor		Congener			Congener
Data Source	Site ID	Depth (m)	GIS-latitude	GIS-longitude	Q	**PPDDE (ug/kg)**	Q	sumDDT (1/2RL) (ug/kg)	Q	**maxPCB (ug/kg)**	Maximum PCBtype	Q	sumPCB (1/2RL) (ug/kg)	Q	maxPCB (ug/kg)	Maximum PCBtype	Q	**sumPCB (1/2RL) (ug/kg)**
LACSD	8A		33.68780	-118.33900		**2951.20**	<	4262.50		**276.75**	AROCLOR 1254	<	712.88		NA	NA		**NA**
LACSD	8B		33.69220	-118.33730		**11980.00**	<	15989.39	<	**1291.70**	AROCLOR 1254	<	11360.00		210	PCB CONGENER 101	<	**1282.28**
LACSD	8C		33.69850	-118.33570		**19646.67**	<	72857.52	<	**1295.32**	AROCLOR 1242	<	9537.00		341	PCB CONGENER 66	<	**2296.93**
LACSD	8D		33.70700	-118.32980		**393.00**	<	3731.70	<	**50.00**	AROCLOR 1221	<	753.70	<	10.7	PCB CONGENER 101	<	**215.25**
LACSD	9A		33.67630	-118.32430		**3959.60**	<	5640.90		**365.75**	AROCLOR 1254	<	837.50		NA	NA		**NA**
LACSD	9B		33.68150	-118.32180		**5215.56**	<	6897.84	<	**526.00**	AROCLOR 1254	<	2769.13		36.2	PCB CONGENER 101	<	**411.33**
LACSD	9C		33.68870	-118.31830		**1757.33**	<	2417.85	<	**194.60**	AROCLOR 1254	<	1868.35		19.5	PCB CONGENER 114	<	**251.92**
LACSD	9D		33.69950	-118.31300		**303.89**	<	436.32	<	**62.50**	AROCLOR 1221	<	453.50	<	11.3	PCB CONGENER 101	<	**228.23**

Footnotes
NA - Not Analyzed, ND - Not Detected

APPENDIX 2
Estimation of Santa Monica Bay Water Column Concentration of DDT and PCB

Surface sediment lookup table sub-constituents analyzed for SMB water column DDT and PCB mass and concentration estimation

Total DDT	**PCB (Aroclors)**	**PCB (Congeners)**
(sub-constituents)	(sub-constituents)	(sub-constituents)
OP'-DDD	AROCLOR 1016	PCB CONGENER 18
OP'-DDE	AROCLOR 1221	PCB CONGENER 28
OP'-DDT	AROCLOR 1232	PCB CONGENER 37
PP'-DDD	AROCLOR 1242	PCB CONGENER 44
PP'-DDE	AROCLOR 1248	PCB CONGENER 49
PP'-DDT	AROCLOR 1254	PCB CONGENER 52
	AROCLOR 1260	PCB CONGENER 66
		PCB CONGENER 70
		PCB CONGENER 74
		PCB CONGENER 77
		PCB CONGENER 81
		PCB CONGENER 87
		PCB CONGENER 99
		PCB CONGENER 101
		PCB CONGENER 105
		PCB CONGENER 110
		PCB CONGENER 114
		PCB CONGENER 118
		PCB CONGENER 119
		PCB CONGENER 123
		PCB CONGENER 126
		PCB CONGENER 128
		PCB CONGENER 138
		PCB CONGENER 149
		PCB CONGENER 151
		PCB CONGENER 153
		PCB CONGENER 156
		PCB CONGENER 157
		PCB CONGENER 158
		PCB CONGENER 167
		PCB CONGENER 168
		PCB CONGENER 169
		PCB CONGENER 170
		PCB CONGENER 177
		PCB CONGENER 180
		PCB CONGENER 183
		PCB CONGENER 187
		PCB CONGENER 189
		PCB CONGENER 194
		PCB CONGENER 201
		PCB CONGENER 206