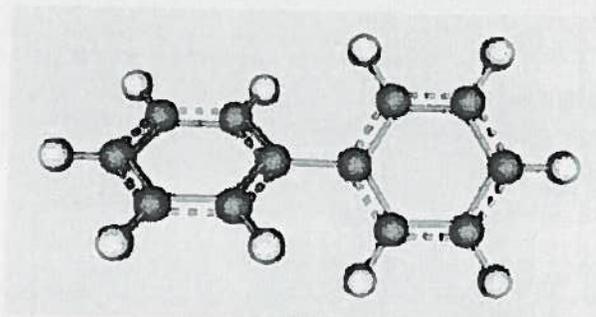


**General Overview of the background information to understand the PCB data concern – to assist in discussion at the 1/25/12 Stakeholder meeting**

**Biphenyl molecule – two carbon rings with hydrogen atoms attached**



**PCBs – polychlorinated biphenyls are made by removing the hydrogen atoms and replacing them with chlorine atoms**

**Congeners**

**Congener is the term used with PCBs to designate the location and quantity of the chlorine atoms in a particular PCB molecule. There are 209 congeners – designated as PCB1, PCB2, PCB3... up to PCB209. Each designation represents a different number and configuration of chlorine atoms.**

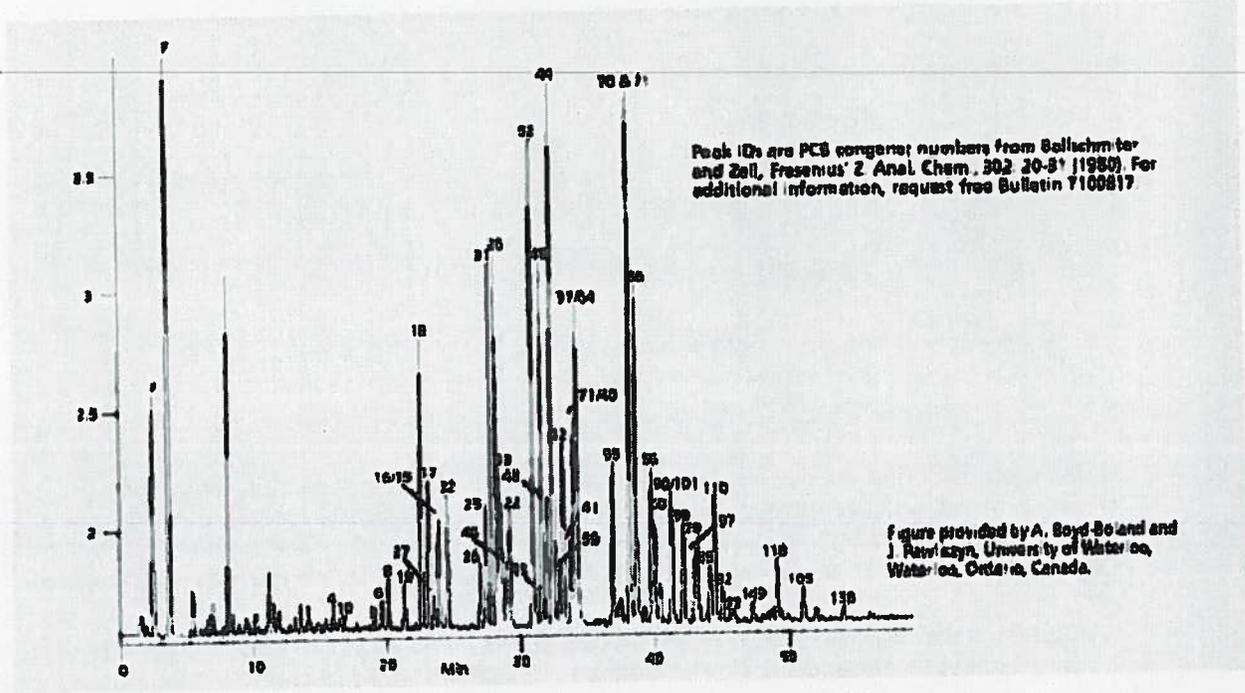
**Aroclors**

**Aroclors are a mixture of PCB molecules that are produced under specific temperature and pressure conditions to produce the desired mixture. Each aroclor starts with the number 12 which signifies the 12 carbon atoms of the biphenyl molecule. The number at the end of the aroclor signifies the percent of chlorine in the mixture. So aroclor 1254 contains 54% chlorine. Aroclor 1260 contains 60% chlorine. Aroclor mixtures can contain many different congeners.**

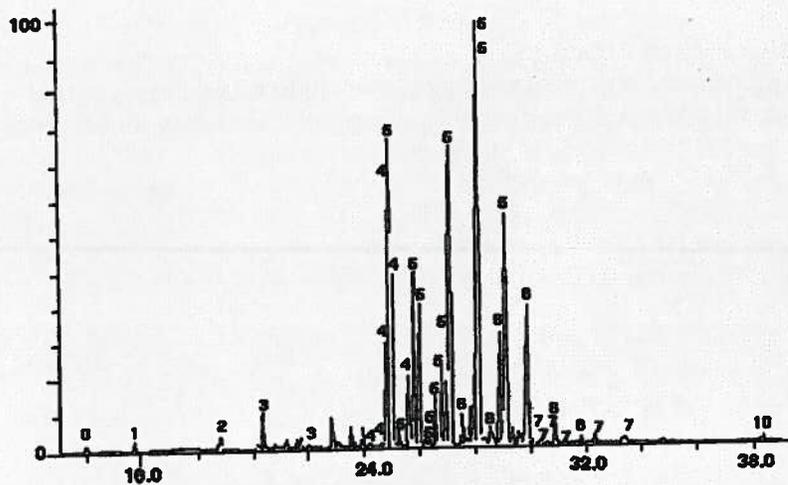
**Analysis for PCBs**

**In the analytical laboratory, the sediment sample is extracted with solvent and a small amount is put into a gas chromatograph. The graph is then analyzed and the peaks are identified.**

This is an example graph where the individual PCB congeners are identified.



Here is an example graph of an aroclor1254 standard



The Yosemite slough sediment contains a mixture of different aroclors that are made up of different congeners. The graph has to be interpreted correctly for the laboratory to report a result as either congeners or aroclors.

In addition, since the samples can contain a mixture of different aroclors, the laboratory has to interpret the graphs correctly to identify the different mixtures if they are reporting the results as aroclors.

### **Total PCBs**

If the analysis is reported as a sum of congeners it is reported one way. If the analysis is being reported as aroclors it is reported in a different manner. So the end result can be different totals using either the congener or aroclor method. In the Yosemite Slough sediment study a subset of the total congeners were measured. This congener list is called the 18 NOAA NS&T list and is commonly used in marine sediment PCB studies including the Navy Parcel F study. In most cases, if the same set of PCB data is reported using congener vs. aroclor methods – the aroclor method results in a total that is approximately two times the total using the congener method (see references cited in Gregg's letter)

### **Potential problems noted with reported aroclor results**

Gregg pointed out in his letter that it appears that the graphs of the aroclor results may not have been interpreted properly by the analytical laboratory. The concern with the misinterpretation is that the laboratory isn't reporting the correct type and quantities of aroclor mixtures (aroclor 1254 vs. 1260). It is relatively simple for the analytical laboratory to review the graphs and report the results again.

Gregg also pointed out that the difference between the reported sum of the congeners vs. the aroclors in the EPA report is approximately a factor between two and eight. So it appears that the misinterpretation of aroclor data by the analytical laboratory is overestimating the total amount of PCBs.

For the large detections in Yosemite Slough, this factor doesn't make a difference because if you divide the large numbers by a factor of 2 to 8, you still have a large number that will probably be greater than the remediation goal.

So the primary impact is with the lower detections that might be near the screening limit. If you are able to determine that some of the hits may not need to be remediated then it can change the remediation volume.

