Sanitation Districts of Los Angeles County
Joint Water Pollution Control Plant

Proposed Special Study
2013

PASSIVE SAMPLING TO CHARACTERIZE DISSOVLED PERSISTENT ORGANIC POLLUTANT CONCENTRATIONS IN THE WATER COLUMN OF THE PALOS VERDES SHELF SUPERFUND SITE (JWSS-13-002)

Goals and Objectives:

In September 2009, the U.S. Environmental Protection Agency (EPA) released the Interim Record of Decision (IROD) for the Palos Verdes Shelf (PVS) Superfund site. One of the components under the preferred remedial alternative is to cap the most contaminated sediments near the outfall operated by the Sanitation Districts of Los Angeles County (Sanitation District). Monitoring of the persistent organic pollutant concentrations in the water column before, during, and after the capping is necessary to evaluate the effectiveness of the remediation as well as any adverse effects from sediment resuspension induced contaminant release. Measurement of the very low dissolved concentrations of persistent organic pollutants (POPs), including DDTs and PCBs, is technically challenging and time consuming using the traditional techniques. In recent years, *in-situ* passive sampling methods, including solid-phase Microextraction (SPME) and low density polyethylene (PE) strips reduce the labor involved in sampling and post-collection processing, while allowing for dissolved POPs measurement at very low concentrations. Furthermore, passive sampling avoids many of the artifacts associated with traditional methods that result in over- or under estimating dissolved concentrations.

The goal of the proposed Special Study is to assist EPA in their efforts to remediate the PVS Superfund site and their requirement to conduct a five-year review following the 2009 IROD by measuring dissolved persistent organic pollutant concentrations in the water column using passive sampling devices. The objectives of the proposed Special Study are to: 1) measure the dissolved concentrations of DDTs and PCBs in different horizons of the water column and along a spatial gradient away from the highly contaminated zone and at stations up-current of the most highly contaminated sediments, and 2) compare dissolved DDT and PCB concentrations to those measured using the same methods in September 2010.

Benefits:

The proposed Special Study will provide status and trend information relative to the interim and final remediation goals for DDTs and PCBs within the water column. Further, these data will add significantly to our limited knowledge of the concentrations and movement of DDTs and PCBs in water column within PVS superfund site and as a source of these contaminants into Santa Monica Bay in support of the associated DDT/PCB TMDL. Sanitation Districts' Ocean Monitoring and Research Group (OMRG) will also obtain valuable training in the rigging, deployment, and retrieval of passive sampling devices.

Approach:

The OMRG plans to spend three days at sea to deploy passive sampling devices at 17 stations (**Figure 1**). Twelve of the stations (black triangles) were also sampled in the 2010 water column survey targeting the 40 and 60 meters isobaths. Station T11, located at the south rim of San Pedro

shelf, serves as a reference site for the 60 meters isobath. Five additional sampling stations for the proposed study (red stars) were added in the 2013 survey. Stations W2, W3 and W4 are located along the 200 meters water depth while stations to provide information for water concentrations further off the shelf. Stations W1 and W5 are located on the 60 meter isobaths to extend the along shelf spatial coverage at the discharge depth.

The mooring schematic for the samplers is provided in in **Figure 2**. PE samplers are mounted at three water depths: five meters below surface, mid-depth, and five meter from the bottom. SPME devices will be co-deployed at six locations (BA4C, BA7C, BA8C, BA9C, W3, and T11). The passive samplers will be immersed in the water column for 30-day in order to equilibrate with contaminant concentrations in the surrounding seawater. The OMRG expects retrieval of the passive sampling devices to take three days with assistance of scientists from EPA's Office of Research and Development (ORD) in Narragansett, Rhode Island.

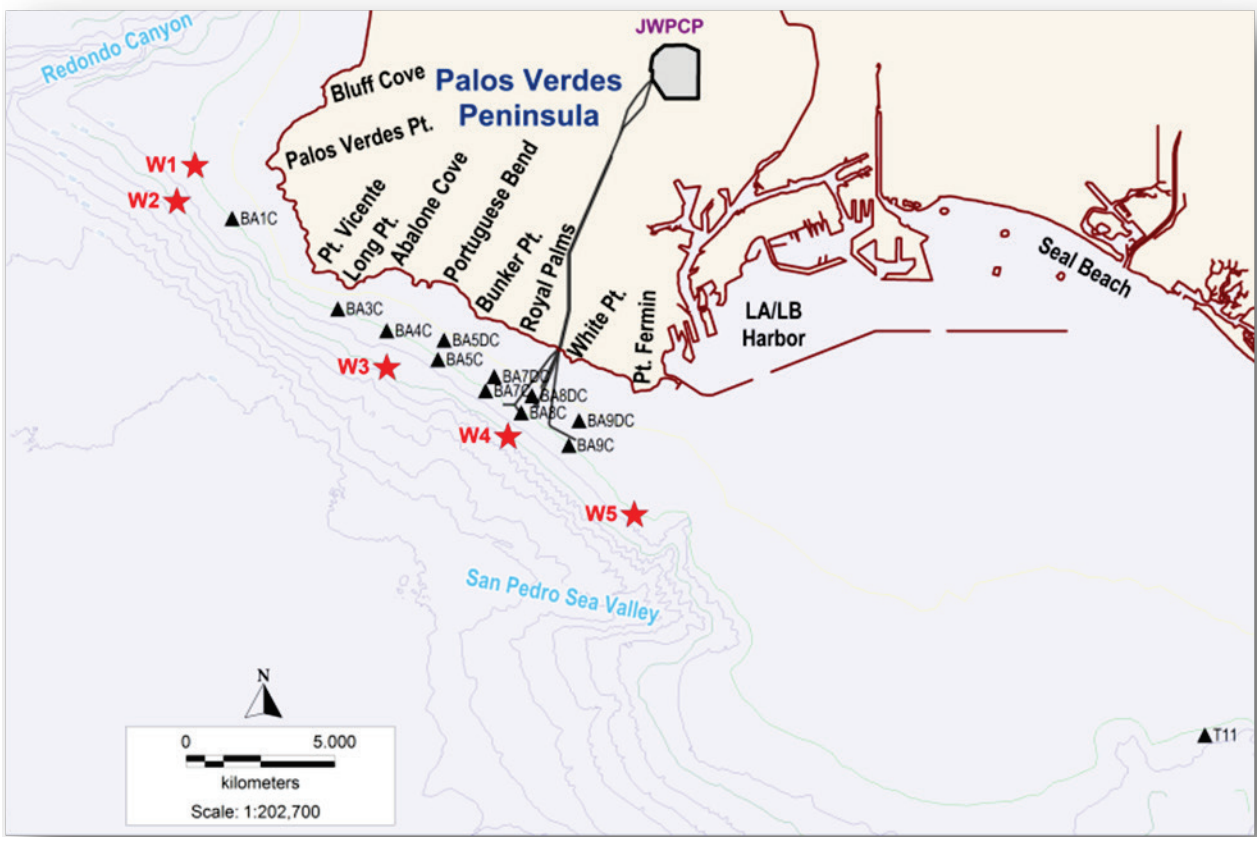

Figure 1 Water Column Sampling Map

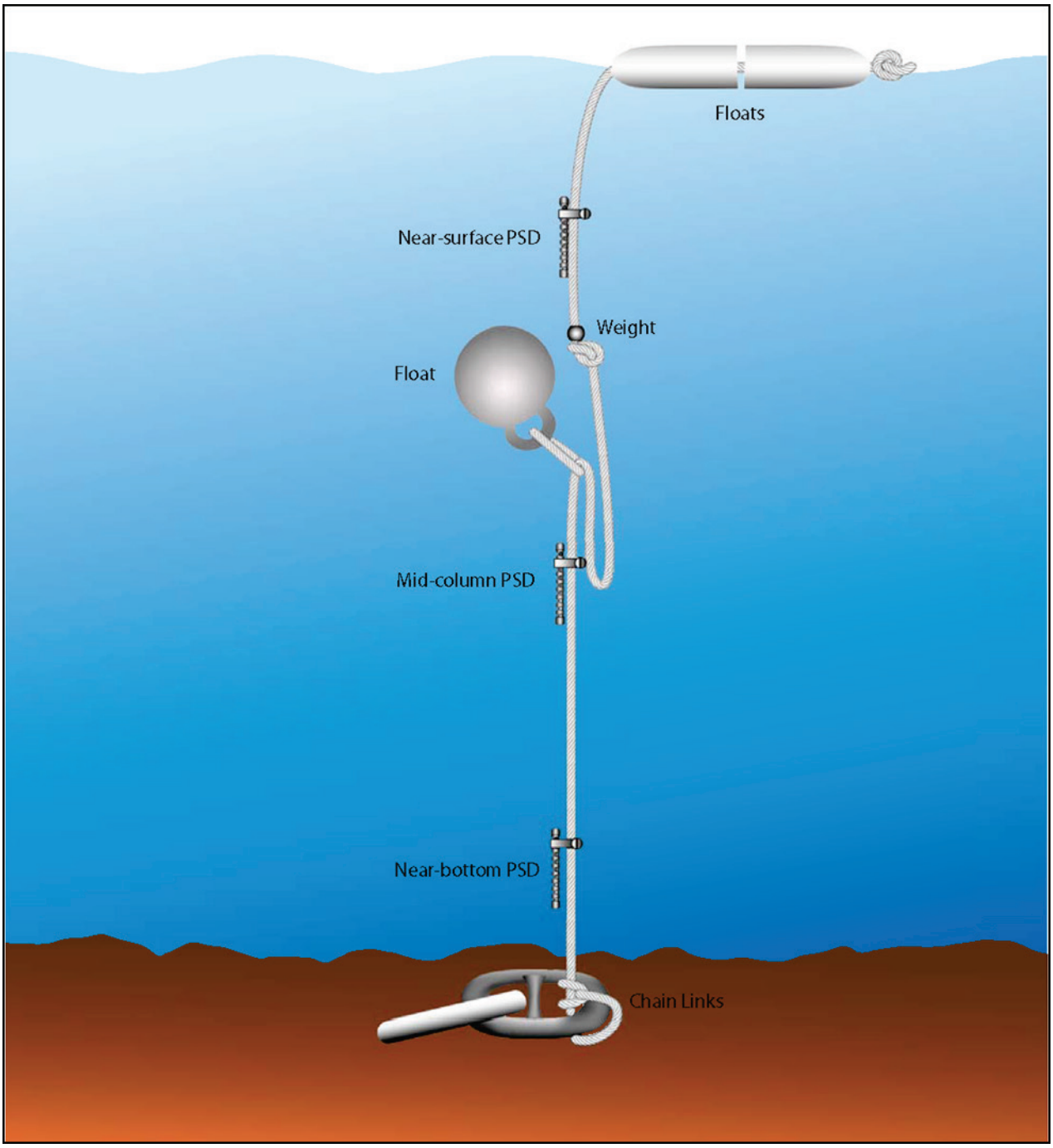

Figure 2 Mooring Schematic for Passive Sampling Device (PSD) in Water Column

Retrieved passive samples will be analyzed for eight DDTs and breakdown products and 28 PCB congeners (**Table 1**) using gas chromatography/mass selective detection (GC/MSD) in the selected-ion monitoring (SIM) mode. PE sample data will be quantified by EPA scientists while SPME sample data will be quantified by chemists at the Southern California Coastal Water Research Project (SCCWRP).

Table 1 List of Analytes for the Water Column Sampling

Analytical group	Analyte	Analytical group	Analyte	Analytical group	Analyte	Analytical group	Analyte
DDT	o,p'-DDE	PCB	PCB 8	PCB	PCB 114	PCB	PCB 169
DDT	p,p'-DDE	PCB	PCB 18	PCB	PCB 118	PCB	PCB 170
DDT	o,p'-DDD	PCB	PCB 28	PCB	PCB 123	PCB	PCB 180
DDT	p,p'-DDD	PCB	PCB 44	PCB	PCB 126	PCB	PCB 187
DDT	o,p'-DDT	PCB	PCB 52	PCB	PCB 128	PCB	PCB 189
DDT	p,p'-DDT	PCB	PCB 66	PCB	PCB 138	PCB	PCB 194
DDT	p,p'-DDMU	PCB	PCB 77	PCB	PCB 153	PCB	PCB 206
DDT	p,p'-DDNU	PCB	PCB 81	PCB	PCB 156	PCB	PCB 209
		PCB	PCB 101	PCB	PCB 157		
		PCB	PCB 105	PCB	PCB 167		

Project Duration:

Passive sampling devices will be deployed in early September of 2013 and retrieved approximate a month later (early October 2013). Analytic results will be available by June of 2014. The final technical report will be prepared and published by EPA in the summer of 2015.

Deliverables:

The primary deliverable will be EPA's technical report scheduled for release in the summer of 2015. Release of this report would signify the completion of this Special Study. Until release of EPA's final report, Sanitation Districts' staff will provide quarterly progress reports to the Los Angeles Regional Water Quality Control Board.

Collaborators:

U.S. EPA Region 9 Superfund

U.S. EPA ORD

Innovative Technical Solutions, Inc. (ITSI) Gilbane Company – EPA contractor

Southern California Coastal Water Research Project (SCCWRP)