Outfall 001

Sample No.1

Date - 10/02/13
Collection Period - 1,440 minutes
Initial Flow - 76 ml/min
Final Flow - 10 ml/min
Average Flow - 43 ml/min
Sample Volume - 61.92 L
Measure Sample Volume - 76.62 L

Oil & Grease - 1.0 mg/L
TSS - 7.4 mg/L

CLAM - 6,002 pg/L Total PCB (Average Flow)
CLAM - 4,850 pg/L Total PCB (Measured Flow)
24-hour Composite - 3,333 pg/L

24-hour Sample Size - 1 L

Sample No.2

Date - 10/03/13
Collection Period - 1,450 minutes
Initial Flow - 62 ml/min
Final Flow - 26 ml/min
Average Flow - 44 ml/min
Sample Volume - 63.80 L
Measure Sample Volume - 86.68 L

Oil & Grease - 0.8 mg/L
TSS - 2.8 mg/L

CLAM - 7,118 pg/L Total PCB (Average Flow)
CLAM - 5,239 pg/L Total PCB (Measured Flow)
24-hour Composite - 3,340 pg/L

24-hour Sample Size - 1 L

Sample No.3

Date - 10/04/13
Collection Period - 1,440 minutes
Initial Flow - 66 ml/min
Final Flow - 6 ml/min
Average Flow - 36 ml/min
Sample Volume - 51.84 L
Measure Sample Volume - 69.62 L

Oil & Grease - 0.8 mg/L
TSS - 2.1 mg/L

CLAM -7,567 pg/L Total PCB (Average Flow)
CLAM - 5,635 pg/L Total PCB (Measured Flow)
24-hour Composite - 3,476 pg/L

24-hour Sample Size - 1 L

CLAM Comparison Data Analysis

Upriver Dam Data Set - PCB by Method 1668

CLAM		1 Liter Grab	
R1	62J pg/L	S1	35J pg/L
R2	76J pg/L		
R3	66J pg/L		
Avg	68J pg/L	Avg	35J pg/L

Lab Method Blank	Lab Method Blank	Transfer Blank
1.7J pg/L	73J pg/L	26J pg/L

CLAM to Grab Sample Ratio - 1.94

Kaiser Outfall 001 Data Set

CLAM		1 Liter 24-hr Composite	
D1	6,002 pg/L	D1	3,333 pg/L
D2	7,118 pg/L	D2	3,340 pg/L
D3	7,567 pg/L	D3	3,476 pg/L
Avg	6,896 pg/L	Avg	3,383 pg/L

Lab Method Blank	Lab Method Blank
0.61 to 0.74 pg/L	34 pg/L

CLAM to Grab Sample Ratio - 2.04

Potential CLAM Path Forward

CLAM Concerns

Current inability to exactly determine sample volume (Equipment)
Apparent consistent offset from grab/composite samples (Process)

CLAM Factors (Equipment)

Equipment modification to add total sample volume measurement

CLAM Factors (Process)

Sample Flux Rate (liters per minute per square inch)
Sample Concentration (picograms per liter)
Sample Collection Duration (minutes)

Experimental Design (Process)

If all three factors considered - three factorial experiment consisting of eight trials
If two factors based on required flux rate - two factorial experiment consisting of four trials