

The data from the Santa Ana-Santa Fe Channel on the northeast side of the former MCAS-Tustin Air Station continue to show how the seepage of groundwater into the channel dramatically changes the water chemistry. The data from the upstream site (SASF10u) show low levels of nitrogen and selenium (the two groundwater markers) and levels of copper and zinc that are typical of dry-weather urban runoff. At the monitoring site downstream of the development, the nitrate and selenium concentrations were consistently higher but the copper and zinc concentrations were consistently lower than those from the upstream location.

C-11.5 Quality Assurance / Quality Control

During the middle of the reporting period the Principal Permittee relocated to a new facility in Orange, California. With that move was the construction of a larger and more modern laboratory. The additional space will allow more efficient sample processing and analysis as well as better quality assurance of Program data.

Overall the proportion of quality assurance samples grew from last year's 13% of sample submittals to 18% this year. The Annual QA/ QC Summary which describes the quality assurance (QA) sample type and percent breakdown are presented in **Attachment C-11-X**.

The Monitoring programs QA officer oversaw preparation and submittals of quality assurance (QA) samples to evaluate the quality of data produced by each of the three contractor laboratories and the Public Health Laboratory. The preparation included synthetic samples for accuracy which are comprised of aliquots of prepared standard solutions in ultra-pure (Nanopure) water matrices where the level of total dissolved solids (TDS) was adjusted with Ultrex grade sodium chloride to simulate comparable levels of TDS in environmental samples. Additionally, replicates of the environmental samples were also submitted to evaluate analytical precision.

Along with the previously described QA regime, the Dry-weather Reconnaissance monitoring staff routinely analyzed synthetically prepared standards to assess the quality of mobile laboratory measurements. Moreover, contractor laboratories supplied QA data relating to their respective internal quality control programs utilizing certified reference materials (CRMs), spiked and replicate samples analyzed along with county environmental sample batches.

The results of the quality assurance program are summarized in tabular and graphic form in **Attachment C-11-X**. Control charts were created to show the performance of the laboratories over the course of the monitoring year. The upper (UCL) and lower (UCL) control limits are shown on each of the control charts.

The results of the QA program show that:

- The precision of analyses for pathogen indicator bacteria were generally within the bounds of the control limits.
- The analyses for nutrients and trace metals in freshwater were generally good for precision.
- The precision of some analyses of samples with salt water matrices collected during storms was outside of the control limits especially lead, thallium, zinc, ammonia, TSS and turbidity.
- Many of the recoveries in the analyses of Oil and Grease were consistently outside control limits. The Program will work with the lab to resolve this issue.
- Although the precision of organophosphate pesticides analyses was good the accuracy of analyses was inconsistent toward the end of the reporting year (June). This dip in performance coincided with a change in analytical services providers. The Program will work with the new contract laboratory to improve the quality of these analyses. If acceptable quality cannot be achieved an alternative vendor which can meet the requirements will be used.
- Some trip blank and equipment blank results showed slight contamination with trace metals possibly due to the use of de-ionized water rather than nanopure water when the Principal Permittee's ultrapure water system failed.

The accuracy of field chemical analyses in the Dry-weather reconnaissance programs was generally acceptable with the exception of the analyses for total chlorine and surfactants (MBAS). For San Diego region, the percent recovery for total chlorine analyses was consistently low (mid 60%) and there were 5 of 7 samples for which the recoveries for MBAS were below 75%. For MBAS, the Santa Ana region also had 6 of 8 samples below acceptable ranges.

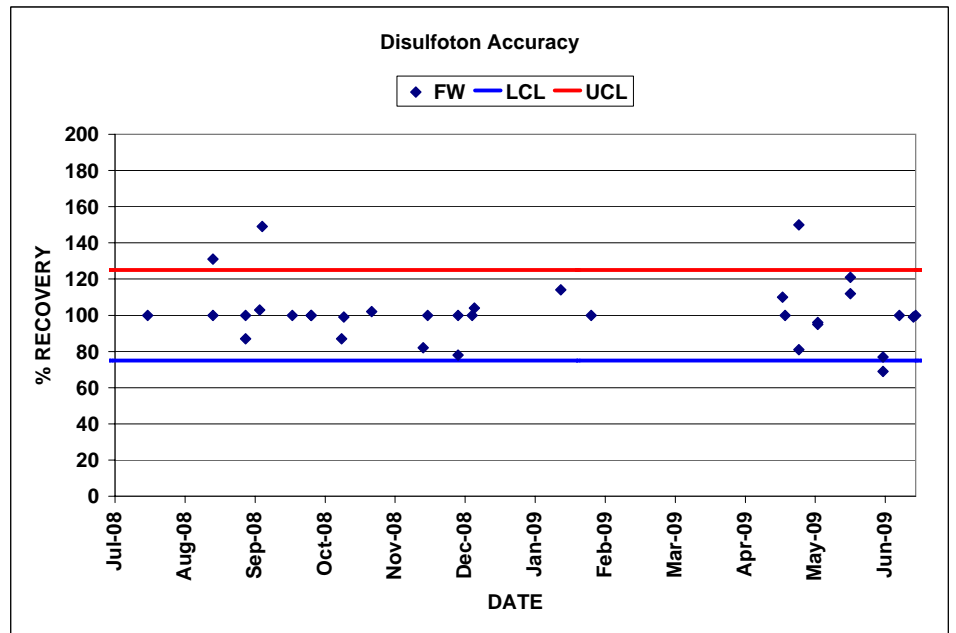
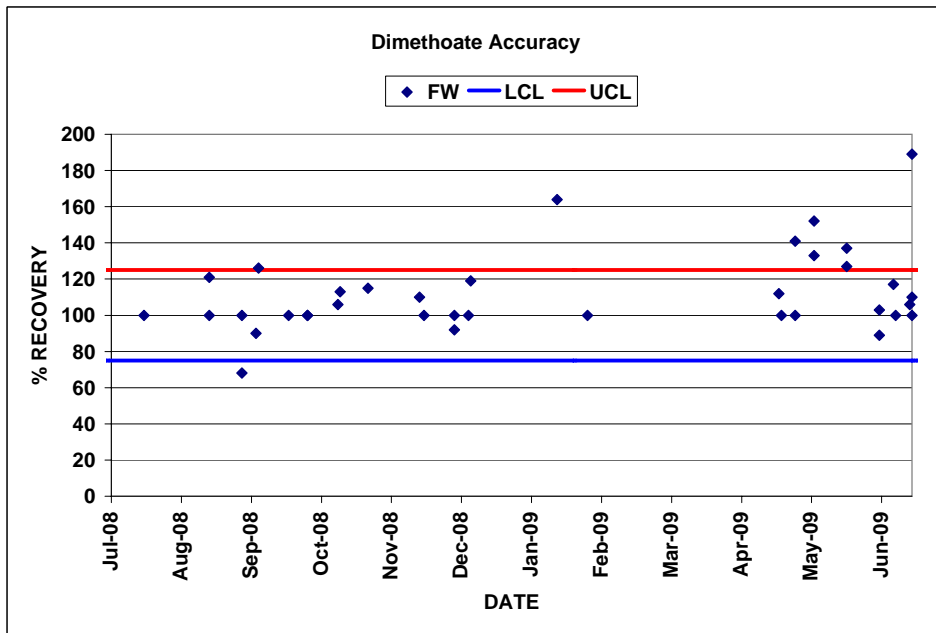
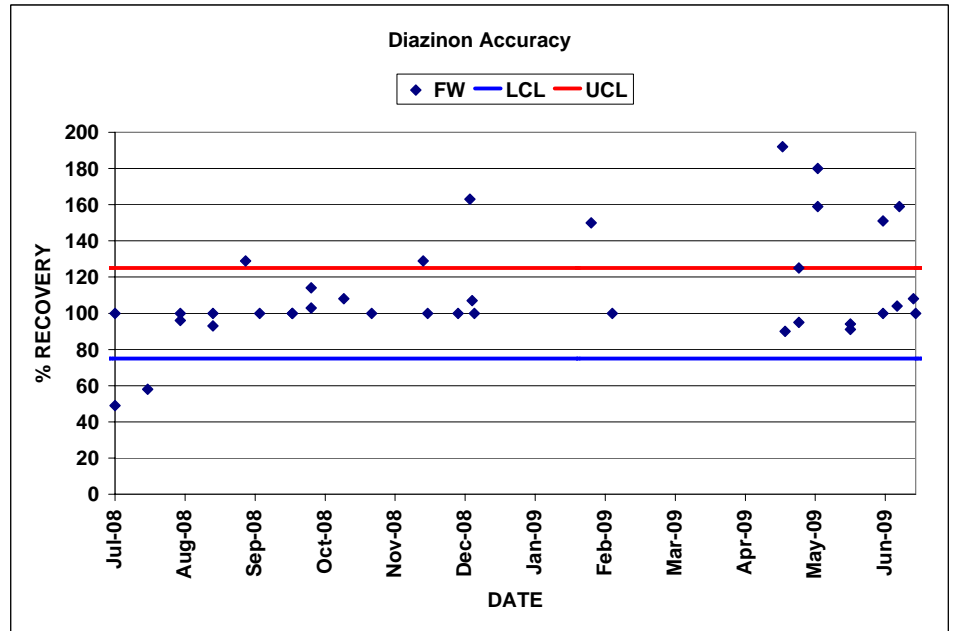
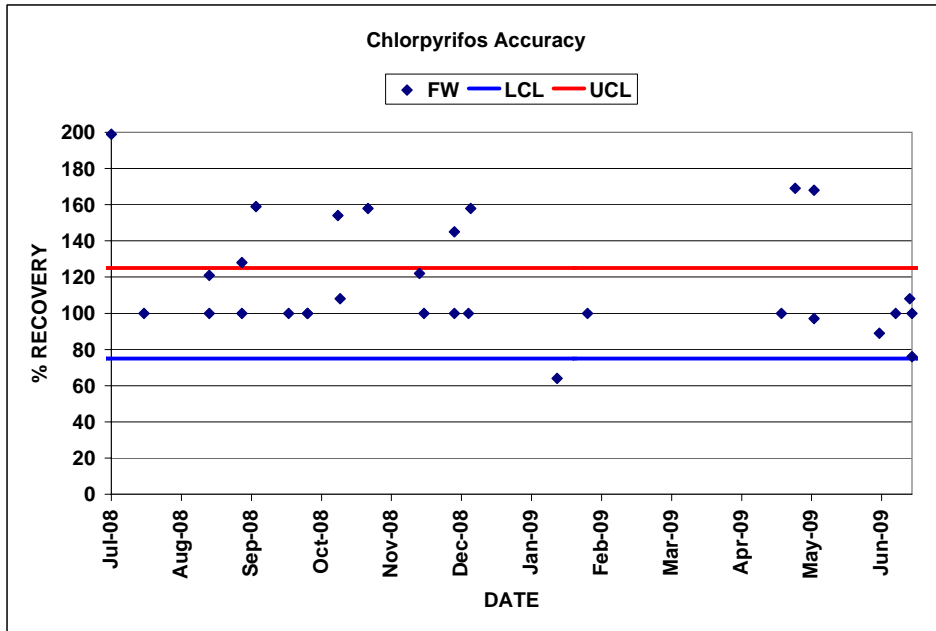
Quality Assurance/ Quality Control
Annual QA/QC Summary

	Total Samples	Bacteria Indicators		Nutrient		Trace Metal			Organophosphate Pesticides		Pesticides (Pyrethroids, Organochlorines, Herbicides, PCBs)		Semi-Volatile Organic Carbon		Oil & Grease		Glyphosate		Methylene Blue Acitvated Surfactants (MBAS)	
		FW	SW	FW	SW	FW	SED	SW	FW	SW	FW	SED	FW	SW	FW	SW	FW	SW	FW	SW
Total Number of Samples	12473	2691	2808	723	487	1269	93	264	802	130	130	134	67	18	488	123	218	123	33	21
Duplicate	742	220	26	77	79	76	6	28	45	15	3	8	2	1	21	12	11	14	1	1
Equipment Blank	387	21		82	1	79		1	38	1	1	0	2	1	24		8		1	1
Synthetic	317	40	4	27	13	40		15	41	15	0	0	5		24	11			1	2
Trip Blank	801	237	9	89	40	74		22	66	22	10	0	7	2	30	15	27	17	4	3
Percent Totals by Category		FW	SW	FW	SW	FW	SED	SW	FW	SW	FW	SED	FW	SW	FW	SW	FW	SW	FW	SW
Percent QA Samples	18.0	19.2	1.4	38.0	27.3	21.2	6.5	25.0	23.7	40.8	10.8	6.0	23.9	22.2	20.3	30.9	21.1	25.2	21.2	33.3
Duplicate	5.9	8.1	0.9	10.6	16.2	5.9	6.4	10.6	5.6	11.5	2.3	5.9	2.9	5.5	4.3	9.7	5	11.3	3	4.7
Equipment Blank	3.1	0.7	0	11.3	0.2	6.2	0	0.3	4.7	0.7	0.7	0	2.9	5.5	4.9	0	3.6	0	3	4.7
Synthetic	2.5	1.4	0.1	3.7	2.6	3.1	0	5.6	5.1	11.5	0	0	7.4	0	4.9	8.9	0	0	3	9.5
Trip Blank	6.4	8.8	0.3	12.3	8.2	5.8	0	8.3	8.2	16.9	7.6	0	10.4	11.1	6.1	12.1	12.3	13.8	12.1	14.2

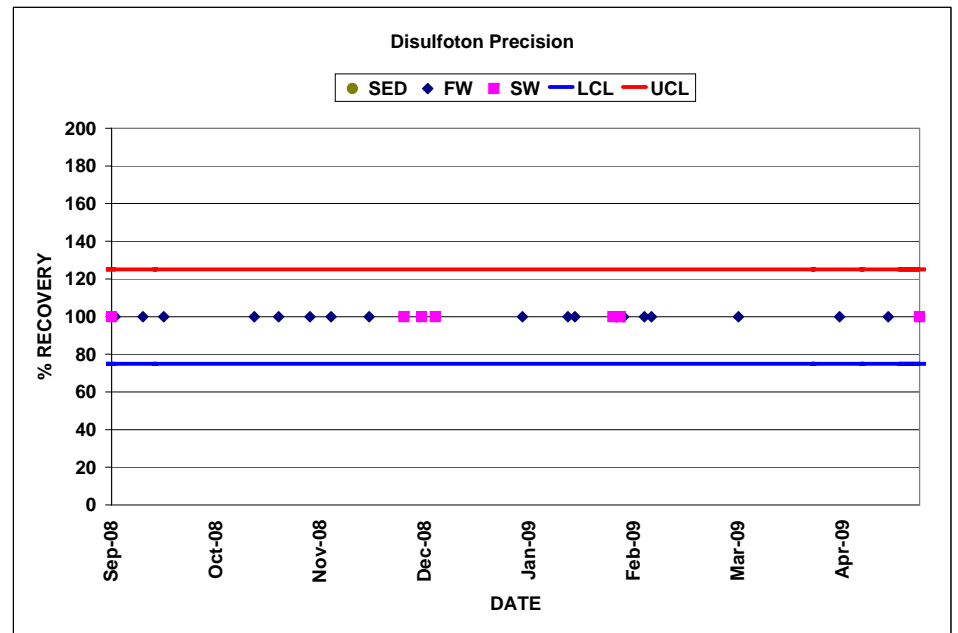
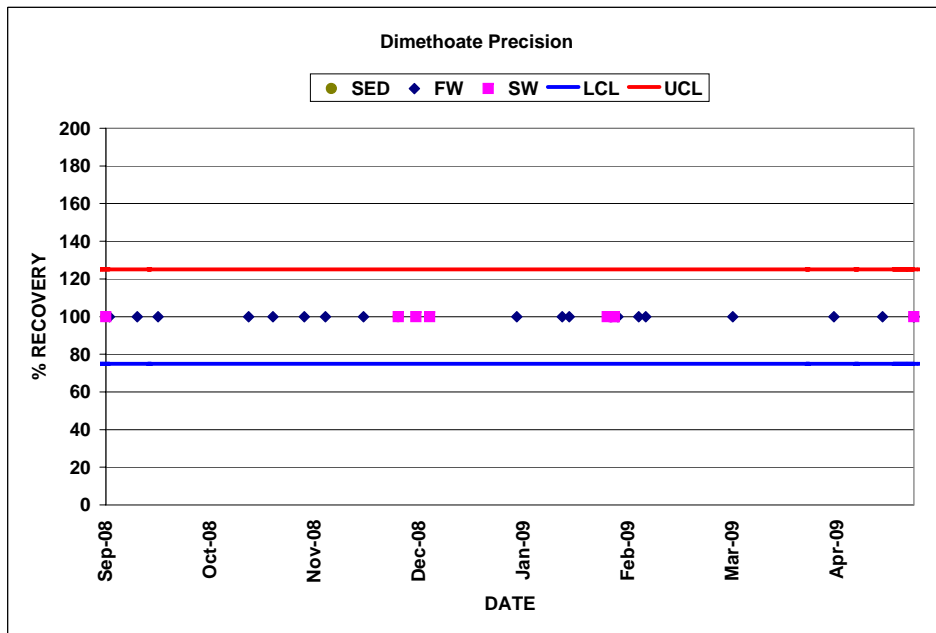
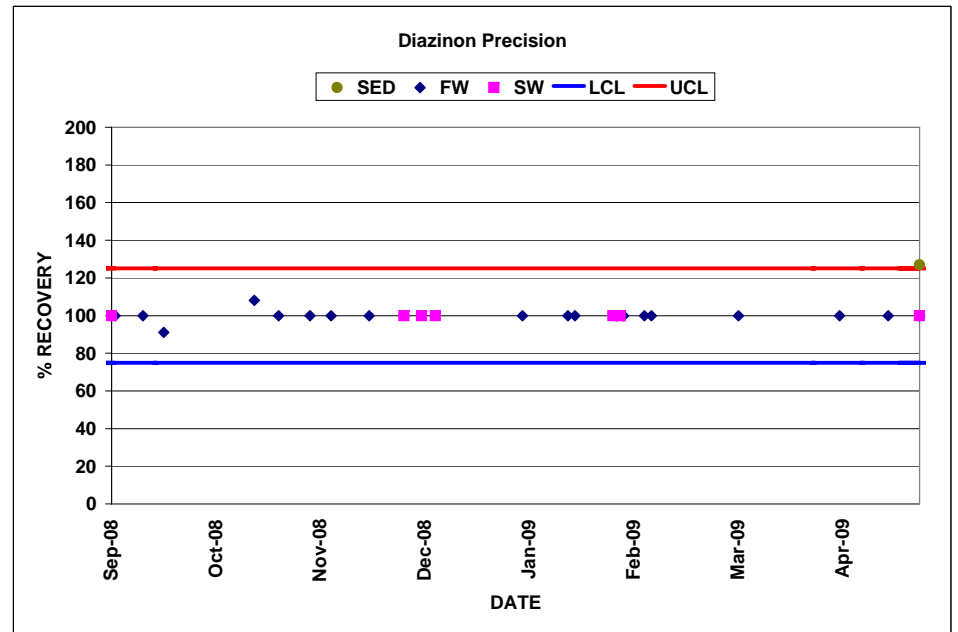
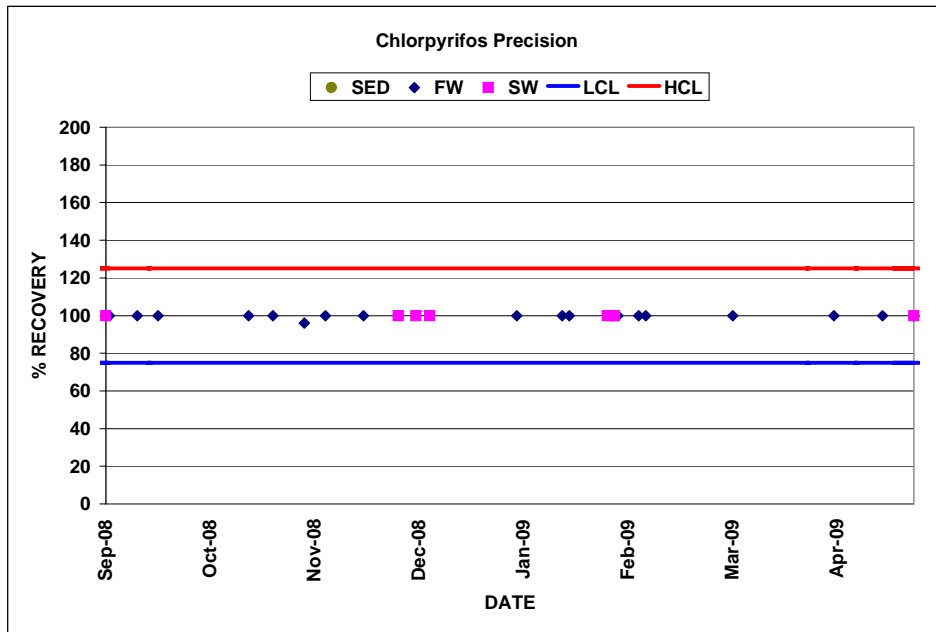
	General Mineral	Chloride, Sulfate	Total Organic Carbon			Total Suspended Solids	
			FW	SW	SED	FW	SW
Total Number of Samples	143	67	820	270	108	419	24
Duplicate	2	4	36	28	6	18	2
Equipment Blank	2	43	61	1	0	19	
Synthetic	17		30	13	2	17	
Trip Blank	20	13	51	22	0	17	4
Percent Totals by Category	FW	FW	FW	SW	SED	FW	SW
Percent QA Samples	28.7	89.6	21.7	23.7	7.4	16.9	25.0
Duplicate	1.3	5.9	4.3	10.3	5.5	4.2	8.3
Equipment Blank	1.3	64.1	7.4	0.3	0	4.5	0
Synthetic	11.8	0	3.6	4.8	1.8	4	0
Trip Blank	13.9	19.4	6.2	8.1	0	4	16.6

FW - Fresh Water
SW - Sea Water
SED - Sediment

Quality Assurance/ Quality Control
Accuracy of Trace Metals



Quality Assurance/ Quality Control
Precision of Nutrient Analysis



Quality Assurance/ Quality Control
Blanks Control Charts

Pyrethroid Pesticides

PP		Units	Allethrin	Bifenthrin	Cyfluthrin	Cypermethrin	Deltamethrin	L-Cyhalothrin	Permethrin	Prallethrin
Equipment Blank	Non-detect	%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	MIN	ng/L	<10	<10	<10	<10	<10	<10	<10	<10
	MAX	ng/L	<10	<10	<10	<10	<10	<10	<10	<10
Trip Blank	Non-detect	%	100.0%	100.0%	83.3%	66.7%	100.0%	100.0%	66.7%	100.0%
	MIN	ng/L	<10	<10	<10	<10	<10	<10	<10	<10
	MAX	ng/L	<10	<10	13	16	<10	<10	28	<10

Organophosphate Pesticides

OPP		Units	Azinphos methyl (Guthion)	Bolstar	Chlorpyrifos	Coumaphos	Demeton-o	Demeton-s	Diazinon	Dichlorvos	Dimethoate	Disulfoton	Ethoprop	Ethyl Parathion	Fensulfothion	Fenthion	Malathion	Merphos	Mevinphos	Naled	Parathion-methyl	Phorate
Equipment Blank	Non-detect	%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	94.4%	100.0%	97.1%	100.0%	100.0%	100.0%	100.0%	97.2%	100.0%	100.0%	100.0%
	MIN	ng/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	MAX	ng/L	<50	<50	<50	<50	<50	<50	<50	<50	<50	15	<50	12	<50	<50	<50	<50	43	<50	<50	<50
Trip Blank	Non-detect	%	100.0%	100.0%	101.5%	101.5%	101.5%	101.5%	101.5%	101.5%	98.5%	98.5%	98.5%	98.5%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	98.5%	98.5%
	MIN	ng/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<20	<10	<10	<10	<10
	MAX	ng/L	<50	<50	<50	<50	<50	<50	<50	<50	11	11	24	17	<50	<50	<50	<50	<50	<50	<50	6.4

OPP		Units	Ronnel	Tetrachlorovinphos	Toxuthion	Trichloronate
Equipment Blank	Non-detect	%	97.1%	100.0%	100.0%	100.0%
	MIN	ng/L	<10	<10	<10	<10
	MAX	ng/L	30	<50	<50	<50
Trip Blank	Non-detect	%	100.0%	98.5%	100.0%	100.0%
	MIN	ng/L	<10	<10	<0.05	<10
	MAX	ng/L	<50	0.17	<50	<50