
**County of Los Angeles
Department of Public Works**

December 2009 Water Quality Monitoring Report

for the

**Master Mitigation Plan
for the Big Tujunga Wash Mitigation Bank**



December 2009 Water Quality Monitoring Report

for

Master Mitigation Plan for the Big Tujunga Wash Mitigation Bank

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Water Quality Monitoring

December 2009

BACKGROUND

The County of Los Angeles Department of Public Works (LADPW) purchased a 207-acre parcel in Big Tujunga Wash as a mitigation bank for County flood control projects throughout Los Angeles County. In coordination with local agencies, the County defined a number of measures to improve habitat quality at the site. A Master Mitigation Plan (MMP) was prepared to guide the implementation of these enhancements. The MMP also includes a monitoring program to gather data on conditions at the site during implementation of the improvements. The MMP was prepared and is currently being implemented by ECORP Consulting, Inc. MWH, a subconsultant to ECORP, is responsible for the water quality monitoring program described in the MMP. Monitoring was conducted on a quarterly basis from the fourth quarter of 2000 through the fourth quarter of 2005. In 2006, monitoring was conducted on a semi-annual basis. In 2007, 2008, and 2009, monitoring was conducted annually, in December. This report presents the results of the water quality sampling for 2009.

The project site is located just east of Hansen Dam in the Shadow Hills area of the City of Los Angeles. Both Big Tujunga Wash, an intermittent stream, and Haines Canyon Creek, a perennial stream, traverse the project site in an east-to-west direction. The two Tujunga ponds are located at the far eastern portion of the site.

Project Site Activities

A timeline of project-related activities that could influence water quality is presented in **Table 1**.

Table 1
Major Activities to Date at the Big Tujunga Wash Mitigation Bank

Month/Year	Activity
4/00	Baseline water quality sampling
11/00 to 11/01	Arundo, tamarisk, and pepper tree removal Chemical (Rodeo®) application
12/00 to 11/02	Water hyacinth removal
12/00	Fish Sampling at Haines Canyon Creek
12/14/00	Water quality sampling
1/01 to present	Exotic aquatic wildlife (non-native fish, crayfish, bullfrog, and turtle) removal – conducted quarterly
2/01	Partial riparian planting
3/01	Selective clearing at Canyon Trails Golf Club
3/12/01	Water quality sampling
6/19/01	Water quality sampling
7/01	Fish Sampling at Haines Canyon Creek
9/11/01	Water quality sampling

**Table 1 (Continued)
Major Activities to Date at the Big Tujunga Wash Mitigation Bank**

Month/Year	Activity
10/01 to 11/01	Fish Sampling at Haines Canyon Creek
12/12/01	Water quality sampling
1/02	Final riparian planting
2/02	Upland replacement planting
3/26/02	Water quality sampling
6/25/02	Water quality sampling
7/02	Fish Sampling at Haines Canyon Creek
9/12/02	Water quality sampling
10/02	Grading at Canyon Trails Golf Club begins
11/02	Fish Sampling at Haines Canyon Creek
12/19/02	Water quality sampling
3/20/03	Water quality sampling
4/1/03	Meeting with Canyon Trails Golf Club to discuss future use of herbicides and fertilizers
6/23/03	Water quality sampling
8/03	Fish Sampling at Haines Canyon Creek
9/30/03	Water quality sampling
Fall 2003	Completion of the golf course construction
12/17/03	Water quality sampling
1/04	Fish Sampling at Haines Canyon Creek
4/2/04	Water quality sampling
4/3/04	Rock Dam Removal Day
6/04	Angeles National Golf Club (previously named Canyon Trails) opens to the public
7/2/04	Water quality sampling
10/5/04	Water quality sampling
12/9/04	Water quality sampling
4/7/05	Water quality sampling
6/30/05	Water quality sampling
10/25/05	Water quality sampling
12/22/05	Water quality sampling
7/11/06	Water quality sampling
12/29/06	Water quality sampling
12/17/07	Water quality sampling
12/29/08	Water quality sampling
8/26/2009 to 10/16/2009	The Station Fire was the largest fire in the recorded history of Angeles National Forest and the 10th largest fire in California since 1933. The fire burned a total of 160,577 acres. The fire was fully contained on October 16, 2009. (Source: Angeles National Forest Incident Update available - http://www.inciweb.org/incident/1856/)
12/15/09	Water quality sampling

Angeles National Golf Club Activities

The monitoring program has been designed to specifically address inputs to the site from upstream land uses such as the Angeles National Golf Club (previously named Canyon Trails Golf Club). Potential impacts to aquatic species from run-on to the site that contains excessive nutrients or pesticides are of primary concern. The golf course has been operating since June 2004.

In March 2004, the golf course maintenance staff indicated that the following chemicals may be used on an as needed basis: Primo™ (a grass growth inhibitor used for turf management; active ingredient – trinexapac-ethyl) and Rodeo® (an herbicide used to control aquatic weeds; active ingredient – glyphosate) (J. Reidinger, pers. comm. to M. Chimienti, LADPW, March 18, 2004). Based on this information, glyphosate was added to the list of sampling parameters starting in the first quarter of 2004.

In December 2004 and February 2005, the Golf Club provided MWH with the golf course's monthly pesticide use reports. The reports indicate that 10 types of chemical products (seven herbicides, one insecticide, one fungicide, and one grass growth inhibitor) were applied. Pesticide use reports were again provided by the Golf Club in April 2007 for the period from November 2006 to March 2007. During this period, pesticides were applied only in November 2006 as summarized in **Table 2**.

Table 2
Pesticide Applications at the Angeles National Golf Course
(November 2006)

Active Ingredient	Manufacturer and Product Name	Applications
Flutolanil	Bayer Prostar 70 WP (fungicide)	One application of 37 pounds on 130,000 sq. ft. of turfgrass
Glyphosate	Verdicon Kleenup Pro (herbicide)	One application of 5 gallons (2% volume) as a spot treatment on turfgrass
Gibberellic Acid	Valent ProGibb T&O (plant growth regulator)	One application of 1 quart on 16 acres of turfgrass
Pyraclostrobin	BASF Insignia 20 WG (fungicide)	One application of 7.2 pounds on 130,000 sq. ft. of turfgrass

Source: Angeles National Golf Course Monthly Summary Pesticide Use Reports for November 2006 through March 2007

In December 2004, the Golf Club also provided MWH with the golf course's water quality monitoring reports to date. The results were summarized and presented in the 2004 Annual Report for the Big Tujunga Wash Mitigation Bank Water Quality Monitoring Program (distributed in February 2005).

In August 2006, the Golf Club provided MWH with additional water quality monitoring reports from the first and second quarters of 2006. The Golf Club's monitoring activities for the first and second quarters of 2006 included:

Water Quality Monitoring Report – December 2009

- Groundwater samples were collected on February 24 and May 17 from two groundwater monitoring wells downgradient from the golf course (MW-1 and MW-2R, located near Foothill Boulevard).
- Surface water samples were collected from Big Tujunga Wash approximately 200 feet east of Foothill Boulevard (sampling site SW-2) on February 24 and May 17.
- For the first and second quarters of 2006, surface water samples were not collected from Haines Canyon Creek (sampling site SW-1, approximately 500 feet east of Foothill Boulevard) since water was not flowing at this site on the sampling dates.

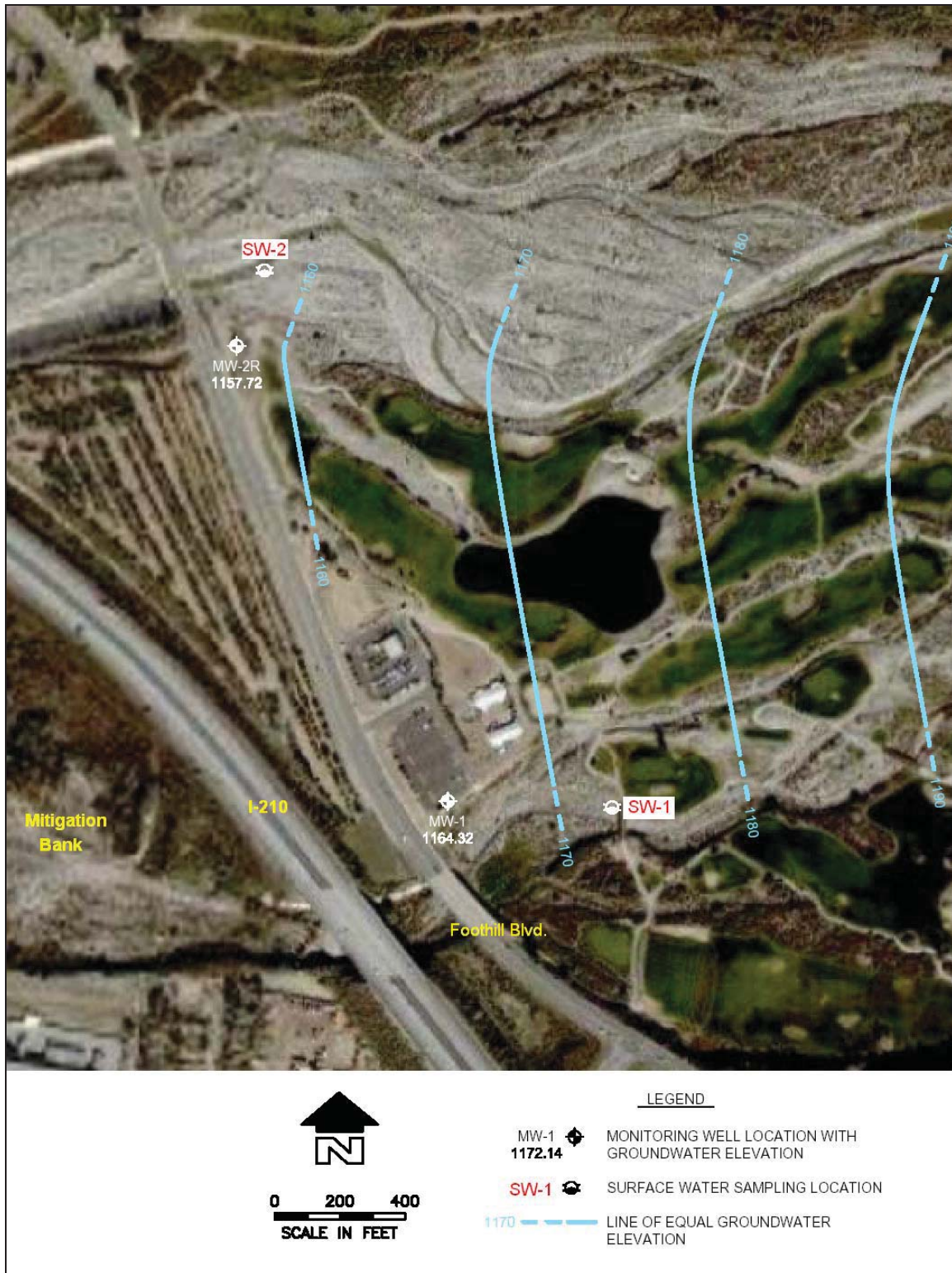
[Source: Angeles National Golf Club First Quarter 2006 Monitoring Report (dated May 3, 2006) and Second Quarter 2006 Monitoring Report (dated July 6, 2006), prepared by Brown and Caldwell for the Los Angeles International Golf Club.]

The following parameters were sampled by the Golf Club in the first and second quarters of 2006:

- General parameters – pH, electrical conductivity, total dissolved solids (TDS), sodium, potassium, calcium, magnesium, carbonate, bicarbonate, sulfate, chloride, nitrate as nitrogen, nitrite as nitrogen, total Kjeldahl nitrogen (TKN), ammonia as nitrogen, oil and grease, and surfactants (MBAS)
- Pesticides – aldrin, chlordane, 4,4-DDD, 4,4-DDE, 4,4-DDT, dieldrin, endosulfan I, endosulfan II, endosulfan sulfate, endrin, endrin aldehyde, heptachlor epoxide, and methoxychlor
- Fungicides – metalaxyl, chlorothalonil, iprodione, propiconazole, vinclozolin, and quinterozone
- Herbicides – proflumicafop, pronamide, P-butylfluzifop, fenoxaprop, pendimethalin, triclopyr, chlorthalid, 2,4-D amine, dicamba, and MCPP
- Insecticides – chlorpyrifos, trichlorfon, and malathion

In both the groundwater and surface water samples collected for the Golf Club during the first and second quarters of 2006, concentrations of pesticides (including fungicides, herbicides and insecticides) were not detected, and general chemical parameters did not exceed state drinking water standards (Angeles National Golf Club, May 2006 and July 2006).

Figure 1
Angeles National Golf Club Groundwater and Surface Water Sampling Sites
(February and May 2006)



Source: Angeles National Golf Club First Quarter 2006 Monitoring Report (dated May 3, 2006), prepared by Brown and Caldwell for the Los Angeles International Golf Club.

MATERIALS AND METHODS

Sampling Stations

Four sampling locations have been identified for the monitoring program for the Big Tujunga Wash Mitigation Bank (**Figure 2**). **Table 3** summarizes sampling locations and the conditions observed on December 15, 2009. The coordinates of the sampling stations were determined by a hand-held Global Positioning System.

Table 3
Water Quality Sampling Locations and Conditions for December 2009

Date	December 15, 2009		
Air Temperature	Approximately 70 degrees Fahrenheit		
Skies	Partly Cloudy		
Observations	Big Tujunga Wash extremely turbid and with significant flow. Surface algae levels very high in the outlet Tujunga pond. Inlet pond surface was clear.		
Sampling Locations	Latitude	Longitude	Time of sample
Haines Canyon Creek	N 34° 16' 2.9"	W 118° 21' 22.2"	1050
Haines Canyon Creek, inflow to Tujunga Ponds	N 34° 16' 6.9"	W 118° 20' 18.7"	1420
Haines Canyon Creek, outflow from Tujunga Ponds	N 34° 16' 7.1"	W 118° 20' 28.3"	1350
Big Tujunga Wash	N 34° 16' 11.7"	W 118° 21' 4.0"	1150

Sampling Parameters

Water Quality. **Table 4** summarizes the sampling parameters included in the water quality monitoring program. The following meters were used in the field:

- Dissolved oxygen and temperature – YSI 550A Field DO meter and thermometer
- pH – Orion 230A pH meter with HACH 51935 electrode

Pesticides were analyzed by Emax Laboratories, Inc., Torrance, California and diazinon and chlorpyrifos were analyzed by CRG Marine Laboratories, Inc., Torrance, California. All other analyses were performed at MWH Laboratories, Monrovia, California. Samples were taken at mid-depth, along a transect perpendicular to the stream channel alignment. Quality assurance/quality control (QA/QC) procedures in each laboratory followed the methods described in their respective Quality Assurance Manuals.

**Table 4
Water Quality Sampling Parameters**

Parameter	Analysis Location	Analytical Method
total Kjeldahl nitrogen (TKN)	laboratory	EPA 351.2
nitrite - nitrogen (NO ₂ -N)	laboratory	EPA 300.0 by IC
nitrate-nitrogen (NO ₃ -N)	laboratory	EPA 300.0 by IC
ammonia (NH ₄)	laboratory	EPA 350.1
orthophosphate - P	laboratory	Standard Methods 4500PE/EPA 365.1
total phosphorus - P	laboratory	Standard Methods 4500PE/EPA 365.1
total coliform	laboratory	Standard Methods 9221B
fecal coliform	laboratory	Standard Methods 9221C
turbidity	laboratory	EPA 180.1
glyphosate (Roundup/Rodeo) ¹	laboratory	EPA 547
chlorpyrifos ²	laboratory	EPA 625
Pesticides/PCBs ³	laboratory	EPA 8081A
dissolved oxygen	field	Standard Methods 4500-O G
total residual chlorine	laboratory	Standard Methods 4500-Cl G
temperature	field	Standard Methods 2550
pH	field	Standard Methods 4500-H+

Sources for analytical methods:

EPA. Method and Guidance for Analysis of Water.

American Public Health Association, American Waterworks Association, and Water Environment Federation. 1998. Standard Methods for the Examination of Water and Wastewater, 20th Edition. Washington D.C.

- 1 First analysis completed in the first quarter of 2004
- 2 First analysis completed in the fourth quarter of 2004. This analytical method (diazinon/chlorpyrifos by GCMS, EPA 625) tests for the following chemicals: diazinon, sulprofos, chlorpyrifos, demeton, dichlorvos, disulfoton, dimethoate, ethoprop, fenchlorophos, fensulfothion, fenthion, merphos, mevinphos, malathion, parathion-methyl, phorate, tokuthion, tetrachlorovinphos, and trichloronate.
- 3 First analysis completed in December 2007. EPA method 8081A tests for aldrin, BHC, Chlordane, DDD, DDE, DDT, dieldrin, endrin, endosulfan, heptaclor, methoxychlor, and toxaphene.




BIG TUJUNGA WASH MITIGATION BANK



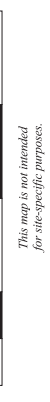
Prepared For:
Alameda County
Department of Public Works

Date: December 3, 1999

Prepared By:
Leslie Beckus
Chambers Group, Inc.

*This map was produced using
ESRI's ArcView software.*



*This map is not intended
for site-specific purposes.*

Figure 2
Mitigation Bank Water Quality Sampling Stations

WQ Station No.	Name
1	Inflow to Tujunga Ponds
2	Outflow from Tujunga Ponds
3	Big Tujunga Wash
4	Haines Canyon Creek, just before exit from site

Discharge Measurements. In addition to the water quality monitoring, flows in the outlet from Big Tujunga Ponds, in Haines Canyon Creek leaving the site, and in Big Tujunga Wash were estimated using a simple field procedure. The technique uses a float to measure stream velocity.

Calculating flow then involves solving the following equation:

$$\text{Flow} = \text{ALC} / \text{T}$$

Where:

A = Average cross-sectional area of the stream (stream width multiplied by average water depth)

L = Length of the stream reach measured (usually 20 feet)

C = A coefficient or correction factor (0.8 for rocky-bottom streams or 0.9 for muddy-bottom streams). This allows you to correct for the fact that water at the surface travels faster than near the stream bottom due to resistance from gravel, cobble, etc. Multiplying the surface velocity by a correction coefficient decreases the value and gives a better measure of the stream's overall velocity.

T = Time, in seconds, for the float to travel the length of L

RESULTS

Baseline Water Quality

Sampling and analysis conducted by LADPW prior to implementation of the MMP is considered the baseline for water quality conditions at the site. The results of baseline analyses conducted in April 2000 are presented in **Table 5**. Higher bacteria and turbidity observed in the 4/18/00 samples are attributable to a rain event. Phosphorus levels were also high in the 4/18/00 samples, due to release from sediments.

December 2009 Results

Water Quality

Results of analyses conducted by MWH, CRG Marine, and Emax Laboratories are appended to this report (**Appendix A**) and summarized in **Table 6**. Note that the yields (percent recoveries) of QC samples were within acceptable limits (percentages) for all samples.

**Table 5
Baseline Water Quality (2000)**

Parameter	Units	Date	Haines Canyon Creek, inflow to Tujunga Ponds	Haines Canyon Creek, outflow from Tujunga Ponds	Big Tujunga Wash	Haines Canyon Creek, just before exit from site
Total coliform	MPN/100 ml	4/12/00	3,000	5,000	170	1,700
		4/18/00	2,200	170,000	2,400	70,000
Fecal coliform	MPN/100 ml	4/12/00	500	300	40	80
		4/18/00	500	30,000	2,400	50,000
Ammonia-N	mg/L	4/12/00	0	0	0	0
		4/18/00	0	0	0	0
Nitrate-N	mg/L	4/12/00	8.38	5.19	0	3.73
		4/18/00	8.2	3.91	0.253	0.438
Nitrite-N	mg/L	4/12/00	0.061	0	0	0
		4/18/00	0.055	0	0	0
Kjeldahl-N	mg/L	4/12/00	0	0.1062	0.163	0
		4/18/00	0	0.848	0.42	0.428
Dissolved phosphorus	mg/L	4/12/00	0.078	0.056	0	0.063
		4/18/00	0.089	0.148	0.111	0.163
Total phosphorus	mg/L	4/12/00	0.086	0.062	0	0.066
		4/18/00	0.113	0.153	0.134	0.211
pH	std units	4/12/00	7.78	7.68	7.96	7.91
		4/18/00	7.18	7.47	7.45	7.06
Turbidity	NTU	4/12/00	1.83	0.38	1.75	0.6
		4/18/00	4.24	323	4070	737

Table 6
Summary of Water Quality Results – December 15, 2009

Parameter	Units	Haines Canyon Creek, Inflow to Tujunga Ponds	Haines Canyon Creek, Outflow from Tujunga Ponds	Big Tujunga Wash	Haines Canyon Creek, just before exit from site
Temperature	°C	17.4	17.5	12.6	15.0
Dissolved Oxygen	mg/L	6.45	6.35	10.55	9.70
pH	std units	7.14	7.24	8.47	8.06
Total residual chlorine	mg/L	ND	ND	ND	ND
Ammonia-Nitrogen	mg/L	ND	ND	0.37	ND
Kjeldahl Nitrogen	mg/L	ND	ND	11	ND
Nitrite-Nitrogen	mg/L	ND	ND	0.076	ND
Nitrate-Nitrogen	mg/L	7.9	6.0	0.81	5.0
Orthophosphate-P	mg/L	0.038	0.030	0.95	0.036
Total phosphorus-P	mg/L	0.029	ND	4.4	0.029
Glyphosate	µg/L	ND	ND	ND	ND
Chloropyrifos*	ng/L	ND	ND	ND	ND
Pesticides/PCBs (EPA 8081A)**	µg/L	ND	ND	ND	ND
Turbidity	NTU	0.73	0.34	1,900	1.3
Fecal Coliform Bacteria	(MPN/100 ml)	30	13	16,000	50
Total Coliform Bacteria	(MPN/100 ml)	800	2,000	5,000,000	1300

NTU – nephelometric turbidity units

MPN – most probable number

ND – non-detect

* The analytical method used for chloropyrifos (diazinon/chlorpyrifos by GCMS, EPA 625) also tests for the following chemicals: diazinon, sulprofos, demeton, dichlorvos, disulfoton, dimethoate, ethoprop, fenchlorophos, fensulfothion, fenthion, merphos, mevinphos, malathion, parathion-methyl, phorate, tokuthion, tetrachlorovinphos, and trichloronate.

** EPA method 8081A tests for aldrin, BHC, Chlordane, DDD, DDE, DDT, dieldrin, endrin, endosulfan, heptachlor, methoxychlor, and toxaphene.

Discharge Measurements

Using the field technique described above, flows in the outlet from Big Tujunga Ponds and in Haines Canyon Creek leaving the site were approximated. Flows in Big Tujunga Wash could not be safely measured. Estimated flows for December 2009 are summarized in **Table 7**.

**Table 7
Estimated Flows for December 2009**

Sampling Date	Approximate Flow (cubic feet per second)		
	Outlet of Big Tujunga Ponds	Haines Canyon Creek leaving the site	Big Tujunga Wash
12/15/2009	4.5	2.7	>50

Comparison of Results with Aquatic Life Criteria

Tables 8 and **12** present objectives established by the Los Angeles Regional Water Quality Control Board (Regional Board) for protection of beneficial uses in Big Tujunga Wash including wildlife habitat. EPA’s criteria for freshwater aquatic life are also presented in **Tables 8, 9, 10, 11** and **13**.

**Table 8
National and Local Recommended Water Quality Criteria - Freshwaters**

Parameter	Basin Plan Objectives ^a	EPA Criteria		
		CMC	CCC	Human Health
Temperature (°C)	b	See Table 11	See Table 11	--
Dissolved oxygen (mg/L)	>7.0 mean >5.0 min	5.0 ^c (warmwater, early life stages, 1-day minimum)	6.0 ^c (warmwater, early life stages, 7-day mean)	--
pH	6.5 - 8.5	--	6.5-9.0 ^{d,e}	5.0-9.0 ^{d,e}
Total residual chlorine (mg/L)	0.1	0.019 ^{d,e}	0.011 ^{d,e}	4.0 (maximum residual disinfectant level goal)
Fecal coliform (MPN/100 ml)	200 ^f (water contact recreation)	--	--	Swimming stds: 33 ^g (geometric mean for enterococci) 126 ^g (geometric mean for <i>E. coli</i>)
Ammonia-nitrogen (mg/L)	See Table 12	See Tables 9, 10, and 11	See Tables 9, 10, and 11	--
Nitrite-nitrogen (mg/L)	1	--	--	1 (primary drinking water std.)
Nitrate-nitrogen (mg/L)	10	--	--	10 (primary drinking water std.)
Total phosphorus (mg/L)	--	<0.05 – 0.1 ^e (recommendation for streams, no criterion)		--
Turbidity (NTU)	h	i	i	5 (secondary drinking water standard) 0.5 – 1.0 (std. for systems that filter)

Notes:

-- No criterion

CMC Criteria Maximum Concentration or acute criterion

CCC Criteria Continuous Concentration or chronic criterion

a Source: California Regional Water Quality Control Board, Los Angeles Region. 1994. Water Quality Control Plan (Basin Plan).

b Narrative criterion: “The natural receiving water temperature of all regional waters shall not be altered unless it can be demonstrated to the satisfaction of the Regional Board that such alteration in temperature does not adversely affect beneficial uses.”

c Source: USEPA. 1986. Ambient Water Quality Criteria for Dissolved Oxygen. EPA 440-5-86-003. Washington, D.C.

d Source: USEPA. 1999. National Recommended Water Quality Criteria – Correction. EPA 822-Z-99-001. Washington, D.C.

e Source: USEPA. 1986. Quality Criteria for Water. EPA 440/5-86-001. Washington, D.C.

f Standard based on a minimum of not less than four samples for any 30-day period, 10% of total samples during any 30-day period shall not exceed 400/100ml.

g Source: USEPA. 1986. Ambient Water Quality Criteria for Bacteria – 1986. EPA 440-5-84-002. Washington, D.C.

h Narrative criterion: “Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses.”

i Narrative criterion for freshwater fish and other aquatic life: “Settleable and suspended solids should not reduce the depth of the compensation point for photosynthetic activity by more than 10 percent from the seasonally established norm for aquatic life.”

Table 9
Numeric Values of the Criterion Maximum Concentration (CMC) with Salmonids Present and Absent and the Criterion Continuous Concentration (CCC) for Ammonia Nitrogen (mg/L)

pH	CMC with Salmonids Present	CMC with Salmonids Absent	CCC
6.5	32.6	48.8	3.48
6.6	31.3	46.8	3.42
6.7	29.8	44.6	3.36
6.8	28.1	42.0	3.28
6.9	26.2	39.1	3.19
7.0	24.1	36.1	3.08
7.1	22.0	32.8	2.96
7.2	19.7	29.5	2.81
7.3	17.5	26.2	2.65
7.4	15.4	23.0	2.47
7.5	13.3	19.9	2.28
7.6	11.4	17.0	2.07
7.7	9.65	14.4	1.87
7.8	8.11	12.1	1.66
7.9	6.77	10.1	1.46
8.0	5.62	8.4	1.27
8.1	4.64	6.95	1.09
8.2	3.83	5.72	0.935
8.3	3.15	4.71	0.795
8.4	2.59	3.88	0.673
8.5	2.14	3.2	0.568
8.6	1.77	2.65	0.480
8.7	1.47	2.2	0.406
8.8	1.23	1.84	0.345
8.9	1.04	1.56	0.295
9.0	0.885	1.32	0.254

Source: USEPA. 1999. 1999 Update of Ambient Water Quality Criteria for Ammonia. EPA 822-R-99-014. Washington, D.C.

Table 10
Temperature and pH-Dependent Values of the Ammonia-Nitrogen CCC (Chronic Criterion) for Fish Early Life Stages Absent

CCC for Fish Early Life Stages Absent, mg N/L										
pH	Temperature (°Celsius)									
	0-7	8	9	10	11	12	13	14	15*	16*
6.5	10.8	10.1	9.51	8.92	8.36	7.84	7.35	6.89	6.46	6.06
6.6	10.7	9.99	9.37	8.79	8.24	7.72	7.24	6.79	6.36	5.97
6.7	10.5	9.81	9.20	8.62	8.08	7.58	7.11	6.66	6.25	5.86
6.8	10.2	9.58	8.98	8.42	7.90	7.40	6.94	6.51	6.10	5.72
6.9	9.93	9.31	8.73	8.19	7.68	7.20	6.75	6.33	5.93	5.56
7.0	9.60	9.00	8.43	7.91	7.41	6.95	6.52	6.11	5.73	5.37
7.1	9.20	8.63	8.09	7.58	7.11	6.67	6.25	5.86	5.49	5.15
7.2	8.75	8.20	7.69	7.21	6.76	6.34	5.94	5.57	5.22	4.90
7.3	8.24	7.73	7.25	6.79	6.37	5.97	5.60	5.25	4.92	4.61
7.4	7.69	7.21	6.76	6.33	5.94	5.57	5.22	4.89	4.59	4.30
7.5	7.09	6.64	6.23	5.84	5.48	5.13	4.81	4.51	4.23	3.97
7.6	6.46	6.05	5.67	5.32	4.99	4.68	4.38	4.11	3.85	3.61
7.7	5.81	5.45	5.11	4.79	4.49	4.21	3.95	3.70	3.47	3.25
7.8	5.17	4.84	4.54	4.26	3.99	3.74	3.51	3.29	3.09	2.89
7.9	4.54	4.26	3.99	3.74	3.51	3.29	3.09	2.89	2.71	2.54
8.0	3.95	3.70	3.47	3.26	3.05	2.86	2.68	2.52	2.36	2.21
8.1	3.41	3.19	2.99	2.81	2.63	2.47	2.31	2.17	2.03	1.91
8.2	2.91	2.73	2.56	2.40	2.25	2.11	1.98	1.85	1.74	1.63
8.3	2.47	2.32	2.18	2.04	1.91	1.79	1.68	1.58	1.48	1.39
8.4	2.09	1.96	1.84	1.73	1.62	1.52	1.42	1.33	1.25	1.17
8.5	1.77	1.66	1.55	1.46	1.37	1.28	1.20	1.13	1.06	0.990
8.6	1.49	1.40	1.31	1.23	1.15	1.08	1.01	0.951	0.892	0.836
8.7	1.26	1.18	1.11	1.04	0.976	0.915	0.858	0.805	0.754	0.707
8.8	1.07	1.01	0.944	0.885	0.829	0.778	0.729	0.684	0.641	0.601
8.9	0.917	0.860	0.806	0.756	0.709	0.664	0.623	0.584	0.548	0.513
9.0	0.790	0.740	0.694	0.651	0.610	0.572	0.536	0.503	0.471	0.442

* At 15° C and above, the criterion for fish ELS absent is the same as the criterion for fish ELS present.
 Source: USEPA. 1999. 1999 Update of Ambient Water Quality Criteria for Ammonia. EPA 822-R-99-014. Washington, D.C.

Table 11
Temperature and pH-Dependent Values of the Ammonia-Nitrogen CCC (Chronic Criterion) for Fish Early Life Stages Present

CCC for Fish Early Life Stages Present, mg N/L										
pH	Temperature (° Celsius)									
	0	14	16	18	20	22	24	26	28	30
6.5	6.67	6.67	6.06	5.33	4.68	4.12	3.62	3.18	2.80	2.46
6.6	6.57	6.57	5.97	5.25	4.61	4.05	3.56	3.13	2.75	2.42
6.7	6.44	6.44	5.86	5.15	4.52	3.98	3.50	3.07	2.70	2.37
6.8	6.29	6.29	5.72	5.03	4.42	3.89	3.42	3.00	2.64	2.32
6.9	6.12	6.12	5.56	4.89	4.30	3.78	3.32	2.92	2.57	2.25
7.0	5.91	5.91	5.37	4.72	4.15	3.65	3.21	2.82	2.48	2.18
7.1	5.67	5.67	5.15	4.53	3.98	3.50	3.08	2.70	2.38	2.09
7.2	5.39	5.39	4.90	4.31	3.78	3.33	2.92	2.57	2.26	1.99
7.3	5.08	5.08	4.61	4.06	3.57	3.13	2.76	2.42	2.13	1.87
7.4	4.73	4.73	4.30	3.78	3.32	2.92	2.57	2.26	1.98	1.74
7.5	4.36	4.36	3.97	3.49	3.06	2.69	2.37	2.08	1.83	1.61
7.6	3.98	3.98	3.61	3.18	2.79	2.45	2.16	1.90	1.67	1.47
7.7	3.58	3.58	3.25	2.86	2.51	2.21	1.94	1.71	1.50	1.32
7.8	3.18	3.18	2.89	2.54	2.23	1.96	1.73	1.52	1.33	1.17
7.9	2.80	2.80	2.54	2.24	1.96	1.73	1.52	1.33	1.17	1.03
8.0	2.43	2.43	2.21	1.94	1.71	1.50	1.32	1.16	1.02	0.897
8.1	2.10	2.10	1.91	1.68	1.47	1.29	1.14	1.00	0.879	0.773
8.2	1.79	1.79	1.63	1.43	1.26	1.11	0.973	0.855	0.752	0.661
8.3	1.52	1.52	1.39	1.22	1.07	0.941	0.827	0.727	0.639	0.562
8.4	1.29	1.29	1.17	1.03	0.906	0.796	0.700	0.615	0.541	0.475
8.5	1.09	1.09	0.990	0.870	0.765	0.672	0.591	0.520	0.457	0.401
8.6	0.920	0.920	0.836	0.735	0.646	0.568	0.499	0.439	0.386	0.339
8.7	0.778	0.778	0.707	0.622	0.547	0.480	0.422	0.371	0.326	0.287
8.8	0.661	0.661	0.601	0.528	0.464	0.408	0.359	0.315	0.277	0.244
8.9	0.565	0.565	0.513	0.451	0.397	0.349	0.306	0.269	0.237	0.208
9.0	0.486	0.486	0.442	0.389	0.342	0.300	0.264	0.232	0.204	0.179

Source: USEPA. 1999. 1999 Update of Ambient Water Quality Criteria for Ammonia. EPA 822-R-99-014. Washington, D.C.

Table 12
Maximum One-Hour Average Concentration for Total Ammonia
(mg/L NH₃)

pH	Temperature (°Celsius)						
	0	5	10	15	20	25	30
6.50	35	33	31	30	29	20	14.3
6.75	32	30	28	27	27	18.6	13.2
7.00	28	26	25	24	23	16.4	11.6
7.25	23	22	20	19.7	19.2	13.4	9.5
7.50	17.4	16.3	15.5	14.9	14.6	10.2	7.3
7.75	12.2	11.4	10.9	10.5	10.3	7.2	5.2
8.00	8.0	7.5	7.1	6.9	6.8	4.8	3.5
8.25	4.5	4.2	4.1	4.0	3.9	2.8	2.1
8.50	2.6	2.4	2.3	2.3	2.3	1.71	1.28
8.75	1.47	1.40	1.37	1.38	1.42	1.07	0.83
9.00	0.86	0.83	0.83	0.86	0.91	0.72	0.58

Source: California Regional Water Quality Control Board, Los Angeles Region. 1994. Water Quality Control Plan (Basin Plan). Taken from USEPA. 1986. Quality Criteria for Water. EPA 440/5-86-001. Washington, D.C.

Table 13
Example Calculated Values for Maximum Weekly Average Temperature for
Growth and Short-Term Maxima for Survival of Juvenile and Adult Fishes During
the Summer

Species	Growth (°Celsius)	Maxima (°Celsius)
Black crappie	27	--
Bluegill	32	35
Channel catfish	32	35
Emerald shiner	30	--
Largemouth bass	32	34
Brook trout	19	24

Source: USEPA. 1986. Quality Criteria for Water. EPA 440/5-86-001. Washington, D.C.

DISCUSSION

Results from the December 2009 sampling program are described by parameter in **Table 14**.

**Table 14
Discussion of December 2009 Big Tujunga Wash Sampling Results**

Parameter	Discussion
Temperature	<ul style="list-style-type: none"> Observed temperatures were below levels of concern for growth and survival of warmwater fish species at all stations.
Dissolved oxygen	<ul style="list-style-type: none"> Dissolved oxygen levels ranged from 6.35 mg/L in the outflow from the ponds to 10.55 in Big Tujunga Wash. DO levels at all stations were above the recommended minimum for warmwater fish species (5.0 mg/L).
pH	<ul style="list-style-type: none"> Lowest pH was observed in the inflow to Tujunga Ponds (7.14), with highest pH observed in Big Tujunga Wash (8.47). On this date, pH measurements at all stations were within the 6.5 to 8.5 range identified in the Basin Plan.
Total residual chlorine	<ul style="list-style-type: none"> No residual chlorine was detected at any station.
Nitrogen	<ul style="list-style-type: none"> Nitrate-nitrogen measurements at all stations were below the drinking water standard of 10 mg/L. Ammonia was above the detection limit in the sample from Big Tujunga Wash. At the temperature (12.6 degrees C) and pH values observed (8.47), ammonia levels in Big Tujunga Wash (0.37 mg/L) were below acute and chronic toxicity criteria.
Phosphorus	<ul style="list-style-type: none"> Total phosphorus levels at all sites except Big Tujunga Wash were below EPA's recommended range for streams to prevent excess algae growth (observed range at these three stations was ND to 0.029 mg/L; recommended range is <0.05 – 0.1 mg/L). At Big Tujunga Wash, the high total phosphorus value of 4.4 mg/L reflects high flow conditions and increases in sediment load as a result of the Station Fire. Higher post-fire erosion rates can increase sediment loads in streams. Phosphorus is carried in the sediment load, including phosphorus from ash.
Glyphosate	<ul style="list-style-type: none"> No glyphosate was detected at any station.
Chloropyrifos	<ul style="list-style-type: none"> Chloropyrifos and the other pesticides tested using EPA's analytical method 625 were not detected at any station.
Pesticides/ PCBs	<ul style="list-style-type: none"> Pesticides and PCBs analyzed by EPA Method 8081A were not detected at any station.
Turbidity	<ul style="list-style-type: none"> Turbidity levels were low (≤ 2 NTU) at all stations except Big Tujunga Wash. Flows in Big Tujunga Wash were highly turbid (1,900 NTU) reflecting high runoff from a recently burned watershed (Station Fire started August 2009, fully contained October 2009).
Bacteria	<ul style="list-style-type: none"> Fecal coliform levels at all stations except Big Tujunga Wash were below the water contact recreation standard of 200 MPN. In Big Tujunga Wash, fecal and total coliform levels were elevated above recreation standards in the highly turbid high runoff (flows estimated to be in excess of 50 cfs).

GLOSSARY

Ammonia-Nitrogen – $\text{NH}_3\text{-N}$ is a gaseous alkaline compound of nitrogen and hydrogen that is highly soluble in water. Un-ionized ammonia (NH_3) is toxic to aquatic organisms. The proportions of NH_3 and ammonium (NH_4^+) and hydroxide (OH^-) ions are dependent on temperature, pH, and salinity.

Chlorine, residual – The chlorination of water supplies and wastewaters serves to destroy or deactivate disease-producing organisms. Residual chlorine in natural waters is an aquatic toxicant.

Chloropyrifos - white crystal-like solid insecticide widely used in homes and on farms. Used to control cockroaches, fleas, termites, ticks crop pests.

Coliform Bacteria – several genera of bacteria belonging to the family Enterobacteriaceae. Based on the method of detection, the coliform group is historically defined as facultative anaerobic, gram-negative, nonspore-forming, rod-shaped bacteria that ferment lactose with gas and acid formation within 48 hours at 35°C .

Fecal Coliform Bacteria – part of the intestinal flora of warm-blooded animals. Presence in surface waters is considered an indication of pollution.

Glyphosate - white compound broad-spectrum herbicide used to kill weeds.

Kjeldahl Nitrogen – Named for the laboratory technique used for detection, Kjeldahl nitrogen includes organic nitrogen and ammonia nitrogen.

Nitrate-Nitrogen – $\text{NO}_3^-\text{-N}$ is an essential nutrient for many photosynthetic autotrophs.

Nitrite-Nitrogen – $\text{NO}_2^-\text{-N}$ is an intermediate oxidation state of nitrogen, both in the oxidation of ammonia to nitrate and in the reduction of nitrate.

Orthophosphorus – the reactive form of phosphorus, commonly used as fertilizer.

pH – the hydrogen ion activity of water (pH) is measured on a logarithmic scale, ranging from 0 to 14. The pH of “pure” water at 25°C is 7.0 (neutral). Low pH is acidic; high pH is basic or alkaline.

Total Phosphorus – In natural waters, phosphorus occurs almost solely as orthophosphates, condensed phosphates, and organically bound phosphate. Phosphorus is essential to the growth of organisms.

Turbidity – attributable to the suspended and colloidal matter in water, including clay, silt, finely divided organic and inorganic matter, soluble colored organic compounds, and plankton and other microscopic organisms. The reduction of clearness in turbid waters diminishes the penetration of light and therefore can adversely affect photosynthesis.

APPENDIX A

**BIG TUJUNGA WASH MITIGATION BANK
WATER QUALITY MONITORING PROGRAM**

LABORATORY RESULTS
December 2009



MWH

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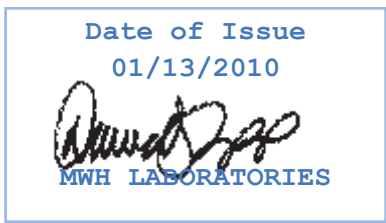
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Laboratory Report

for

MWH Americas - Arcadia
618 Michillinda Ave.
Suite 200
Arcadia, CA 91007
Attention: Sarah Garber
Fax:



DST: David S Tripp
Project Manager



Report#: 321481
Project: BIG-TUJUNGA
Group: Water Quality
Monitoring
PO#: 1342951.010103

Laboratory certifies that the test results meet all **NELAC** requirements unless noted in the Comments section or the Case Narrative. Following the cover page are Hits Reports, Comments, QC Summary, QC Report and Regulatory Forms. This report shall not be reproduced except in full, without the written approval of the laboratory.

Acknowledgement of Samples Received
MWH Americas - Arcadia

 618 Michillinda Ave.
 Suite 200
 Arcadia, CA 91007
 Attn: Sarah Garber
 Phone: 626-568-6910

 Customer Code: MWH-ECORP
 Group #: 321481
 Project #: BIG-TUJUNGA
 Sample Group: Water Quality Monitoring
 Project Manager: David S Tripp
 Phone: (626) 386-1158
 PO #: 1342951.010103

The following samples were received from you on **December 15, 2009**. They have been scheduled for the tests listed below each sample. If this information is incorrect, please contact your service representative. Thank you for using MWH Laboratories.

Sample #	Sample Id	Sample Date
200912150269	HCC121509	15-Dec-2009 1050
	@8081A	@DIAZEDD Subbed
	Fecal Coliform Bacteria	Glyphosate
	Nitrate as NO3 (calc)	Nitrite Nitrogen by IC
	Orthophosphate as PO4	Total Chlorine Residual
	Total Kjeldahl Nitrogen	Total phosphorus as P
		Ammonia Nitrogen
		Nitrate as Nitrogen by IC
		Orthophosphate as P (OPO4)
		Total Coliform Bacteria
		Turbidity
200912150270	BTW121509	15-Dec-2009 1150
	@8081A	@DIAZEDD Subbed
	Fecal Coliform Bacteria	Glyphosate
	Nitrate as NO3 (calc)	Nitrite Nitrogen by IC
	Orthophosphate as PO4	Total Chlorine Residual
	Total Kjeldahl Nitrogen	Total phosphorus as P
		Ammonia Nitrogen
		Nitrate as Nitrogen by IC
		Orthophosphate as P (OPO4)
		Total Coliform Bacteria
		Turbidity
200912150271	TJPOUT121509	15-Dec-2009 1350
	@8081A	@DIAZEDD Subbed
	Fecal Coliform Bacteria	Glyphosate
	Nitrate as NO3 (calc)	Nitrite Nitrogen by IC
	Orthophosphate as PO4	Total Chlorine Residual
	Total Kjeldahl Nitrogen	Total phosphorus as P
		Ammonia Nitrogen
		Nitrate as Nitrogen by IC
		Orthophosphate as P (OPO4)
		Total Coliform Bacteria
		Turbidity
200912150272	TJPIN121509	15-Dec-2009 1420
	@8081A	@DIAZEDD Subbed
	Fecal Coliform Bacteria	Glyphosate
	Nitrate as NO3 (calc)	Nitrite Nitrogen by IC
	Orthophosphate as PO4	Total Chlorine Residual
	Total Kjeldahl Nitrogen	Total phosphorus as P
		Ammonia Nitrogen
		Nitrate as Nitrogen by IC
		Orthophosphate as P (OPO4)
		Total Coliform Bacteria
		Turbidity

Test Description

@8081A -- Organochlorine Pesticides

 @DIAZEDD Subbed -- Diazinon & Chlorpyrifos by EPA 625
 2/46



MWH Laboratories, a Division of MWH Americas, Inc. **Bottle Order for ECORP**
 750 Royal Oaks Drive Suite 100
 Monrovia CA 91016 (626) 386-1100 FAX (626) 386-1124

David Tripp Your MWL Project Manager
 (626) 386-1158 Direct Phone/Voice Mail

BO# 52177

Created by DST

Order Date 12/10/09
 Date Needed by Client 12/11/09
 Date Samples to Arrive at MWL

Ship Sample Kits to
CLIENT PICK-UP FRIDAY, 12/11/09
 MWH/ECORP
 618 Michillinda Ave., Suite 200
 Arcadia, CA 91007

ATTN: Sarah Garber
 PHONE: (626) 568-6910

ATTN: Sarah Garber
 PHONE: (626) 568-6910
 FAX: (626) 568-6102

Client Code MWH/ECORP
 Project Code DRINKING
 PO# / Job# 1342951 010103

Sampler: please return this paper with your samples

Send Report to

MWH/ECORP
 618 Michillinda Ave., Suite 200
 Arcadia, CA 91007

Billing Address

MWH/ECORP
 618 Michillinda Ave., Suite 200
 Arcadia, CA 91007

Group #
 Date Sampled
 Date Received

Project Name

# of Samples	Tests	Qteline#	Bottles-Qty for each sample, type & preservative if any	UN DOT #	Comments
4	TKN		1 125 ml poly+ 0.5ml H2SO4 (50%)	UN 2796	SHIPPING - PLEASE LABEL 4 SEPARATE COOLERS - "ECORP" BIG TUJUNGA WASH WATER QUALITY MONITORING
4	TURB		1 125ml poly/ no preservative		
4	NO3, NO2, OPO4		1 250ml poly/ no preservative	UN 1789	
4	CHLTOT		1 250ml amber glass / no preservative	UN 2796	
4	T-P, NH3		1 250ml poly + 0.5ml H2SO4 (50%)	UN 2796	
4	GLYPHOS		1 125ml amber glass/no preservative		
4	TOTCOL		1 250ml poly sterilized+0.25ml thio (8%)		
4	FECCOL		1 250ml poly sterilized+0.25ml thio (8%)		
4	@DIAZEDD (CHLORPYRIFOS)		3 1L amber glass+ buffer+ascorbic+EDTA+DZU		
4	CUSTSUB (8081 - SUB TO EMAX)		2 1L amber glass no preservative		

Code Status Date Shipped Via Tracking # # of Coolers Prepared By



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Sarah Garber
618 Michillinda Ave.
Suite 200
Arcadia, CA 91007

Laboratory Comments
Report: #321481

Group Comments

Analytical results for Pesticides by 8081A are submitted by Emax Laboratories, Inc.
Torrance, CA
Analytical results for Diazinon and Chlorpyrifos are submitted by CRG Marine Laboratories,
Inc. Torrance, CA



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Laboratory
Hits Report: 321481

MWH Americas - Arcadia

Sarah Garber
618 Michillinda Ave.
Suite 200
Arcadia, CA 91007

Samples Received on:
12/15/2009

Analyzed	Analyte	Sample ID	Result	Federal MCL	Units	MRL
		200912150269	<u>HCC121509</u>			
12/15/2009	17:30	Fecal Coliform Bacteria	50		MPN/100 ml	2
12/15/2009	22:33	Nitrate as Nitrogen by IC	5.0	10	mg/L	0.2
12/15/2009	22:33	Nitrate as NO3 (calc)	22	45	mg/L	0.88
12/16/2009	16:13	Orthophosphate as P	0.036		mg/L	0.01
		Orthophosphate as PO4	0.11		mg/L	0.031
12/15/2009	17:30	Total Coliform Bacteria	1300		MPN/100 ml	2
12/18/2009	13:40	Total phosphorus as P	0.029		mg/L	0.02
12/16/2009	16:03	Turbidity	1.3	5	NTU	0.05
		200912150270	<u>BTW121509</u>			
12/18/2009	14:09	Ammonia Nitrogen	0.37		mg/L	0.05
12/15/2009	17:30	Fecal Coliform Bacteria	16000		MPN/100 ml	2
12/23/2009	17:41	Kjeldahl Nitrogen	11		mg/L	1
12/16/2009	00:22	Nitrate as Nitrogen by IC	0.81	10	mg/L	0.1
12/16/2009	00:22	Nitrate as NO3 (calc)	3.5	45	mg/L	0.44
12/16/2009	00:22	Nitrite Nitrogen by IC	0.076	1	mg/L	0.05
12/16/2009	16:07	Orthophosphate as P	0.95		mg/L	0.05
		Orthophosphate as PO4	2.9		mg/L	0.031
12/15/2009	17:30	Total Coliform Bacteria	5000000		MPN/100 ml	2
12/18/2009	14:12	Total phosphorus as P	4.4		mg/L	0.2
12/16/2009	16:00	Turbidity	1900	5	NTU	2.5
		200912150271	<u>TJPOUT121509</u>			
12/15/2009	17:30	Fecal Coliform Bacteria	13		MPN/100 ml	2
12/15/2009	22:19	Nitrate as Nitrogen by IC	6.0	10	mg/L	0.2
12/15/2009	22:19	Nitrate as NO3 (calc)	26	45	mg/L	0.88
12/16/2009	16:11	Orthophosphate as P	0.030		mg/L	0.01
		Orthophosphate as PO4	0.092		mg/L	0.031
12/15/2009	17:30	Total Coliform Bacteria	2000		MPN/100 ml	2
12/16/2009	16:04	Turbidity	0.34	5	NTU	0.05
		200912150272	<u>TJPIN121509</u>			
12/15/2009	17:30	Fecal Coliform Bacteria	30		MPN/100 ml	2
12/15/2009	23:41	Nitrate as Nitrogen by IC	7.9	10	mg/L	0.2
12/15/2009	23:41	Nitrate as NO3 (calc)	35	45	mg/L	0.88
12/16/2009	16:09	Orthophosphate as P	0.038		mg/L	0.01
		Orthophosphate as PO4	0.12		mg/L	0.031



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Laboratory
Hits Report: 321481

MWH Americas - Arcadia

Sarah Garber
618 Michillinda Ave.
Suite 200
Arcadia, CA 91007

Samples Received on:
12/15/2009

Analyzed	Analyte	Sample ID	Result	Federal MCL	Units	MRL
12/15/2009 17:30	Total Coliform Bacteria		800		MPN/100 ml	2
12/18/2009 13:44	Total phosphorus as P		0.029		mg/L	0.02
12/16/2009 16:05	Turbidity		0.73	5	NTU	0.05



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Laboratory Data
Report: 321481

MWH Americas - Arcadia

Sarah Garber
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Arcadia, CA 91007

Samples Received on:
12/15/2009

Prepared	Analyzed	QC Ref #	Method	Analyte	Result	Units	MRL	Dilution
HCC121509 (200912150269)					Sampled on 12/15/2009 1050			
EPA 8081A - Organochlorine Pesticides								
12/23/2009	20:30		(EPA 8081A)	4,4-DDD	ND	ug/L	0.19	1
12/23/2009	20:30		(EPA 8081A)	4,4-DDE	ND	ug/L	0.19	1
12/23/2009	20:30		(EPA 8081A)	4,4-DDT	ND	ug/L	0.19	1
12/23/2009	20:30		(EPA 8081A)	Aldrin	ND	ug/L	0.095	1
12/23/2009	20:30		(EPA 8081A)	alpha-BHC	ND	ug/L	0.095	1
12/23/2009	20:30		(EPA 8081A)	alpha-Chlordane	ND	ug/L	0.095	1
12/23/2009	20:30		(EPA 8081A)	beta-BHC	ND	ug/L	0.095	1
12/23/2009	20:30		(EPA 8081A)	delta-BHC	ND	ug/L	0.095	1
12/23/2009	20:30		(EPA 8081A)	Dieldrin	ND	ug/L	0.19	1
12/23/2009	20:30		(EPA 8081A)	Endosulfan I	ND	ug/L	0.095	1
12/23/2009	20:30		(EPA 8081A)	Endosulfan II	ND	ug/L	0.19	1
12/23/2009	20:30		(EPA 8081A)	Endosulfan Sulfate	ND	ug/L	0.19	1
12/23/2009	20:30		(EPA 8081A)	Endrin	ND	ug/L	0.19	1
12/23/2009	20:30		(EPA 8081A)	Endrin Aldehyde	ND	ug/L	0.19	1
12/23/2009	20:30		(EPA 8081A)	Endrin Ketone	ND	ug/L	0.19	1
12/23/2009	20:30		(EPA 8081A)	gamma-BHC (Lindane)	ND	ug/L	0.095	1
12/23/2009	20:30		(EPA 8081A)	gamma-Chlordane	ND	ug/L	0.095	1
12/23/2009	20:30		(EPA 8081A)	Heptachlor	ND	ug/L	0.095	1
12/23/2009	20:30		(EPA 8081A)	Heptachlor Epoxide	ND	ug/L	0.095	1
12/23/2009	20:30		(EPA 8081A)	Methoxychlor	ND	ug/L	0.95	1
12/23/2009	20:30		(EPA 8081A)	Toxaphene	ND	ug/L	1.9	1
12/23/2009	20:30		(EPA 8081A)	Decachlorobiphenyl	90	%		1
12/23/2009	20:30		(EPA 8081A)	Tetrachloro-m-xylene	84	%		1
EPA 625 - Diazinon & Chlorpyrifos by EPA 625								
12/18/2009	01/06/2010	00:00	(EPA 625)	Chlorpyrifos	ND	ng/L	2	1
12/18/2009	01/06/2010	00:00	(EPA 625)	Diazinon	ND	ng/L	4	1
EPA 351.2 - Total Kjeldahl Nitrogen								
12/23/2009	15:43	535947	(EPA 351.2)	Kjeldahl Nitrogen	ND	mg/L	0.2	1
EPA 350.1 - Ammonia Nitrogen								
12/18/2009	14:00	535415	(EPA 350.1)	Ammonia Nitrogen	ND	mg/L	0.05	1
SM 9221C - Fecal Coliform Bacteria								
12/15/2009	17:30	535510	(SM 9221C)	Fecal Coliform Bacteria	50	MPN/100 mL	2	1

Rounding on totals after summation.
(c) - indicates calculated results



MWH LABORATORIES

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**Laboratory Data
Report: 321481**

MWH Americas - Arcadia

Sarah Garber
618 Michillinda Ave.
Suite 200
Arcadia, CA 91007

Samples Received on:
12/15/2009

Prepared	Analyzed	QC Ref #	Method	Analyte	Result	Units	MRL	Dilution
SM 9221B - Total Coliform Bacteria								
12/15/2009	17:30	535507	(SM 9221B)	Total Coliform Bacteria	1300	MPN/100 mL	2	1
SM 4500-CL G - Total Chlorine Residual								
12/16/2009	00:00	535611	(SM 4500-CL G)	Total Chlorine Residual	ND	mg/L	0.1	1
EPA 547 - Glyphosate								
12/16/2009	13:09	535178	(EPA 547)	Glyphosate	ND	ug/L	6	1
EPA 300.0 - Nitrate, Nitrite by EPA 300.0								
12/15/2009	22:33	535014	(EPA 300.0)	Nitrate as Nitrogen by IC	5.0	mg/L	0.2	2
12/15/2009	22:33	535014	(EPA 300.0)	Nitrate as NO3 (calc)	22	mg/L	0.88	2
12/15/2009	22:33	535014	(EPA 300.0)	Nitrite Nitrogen by IC	ND	mg/L	0.1	2
SM4500-PE/EPA 365.1 - Total phosphorus as P (T-P)								
12/18/2009	13:40	535404	(SM4500-PE/EPA 365.1)	Total phosphorus as P	0.029	mg/L	0.02	1
4500P-E/365.1 - Orthophosphate as PO4 (CAL)								
:			(4500P-E/365.1)	Orthophosphate as PO4	0.11	mg/L	0.031	1
EPA 180.1 - Turbidity								
12/16/2009	16:03	535204	(EPA 180.1)	Turbidity	1.3	NTU	0.05	1
4500P-E/365.1 - Orthophosphate as P (OPO4)								
12/16/2009	16:13	535443	(4500P-E/365.1)	Orthophosphate as P	0.036	mg/L	0.01	1

BTW121509 (200912150270)

Sampled on 12/15/2009 1150

EPA 8081A - Organochlorine Pesticides								
12/23/2009	20:54		(EPA 8081A)	4,4-DDD	ND	ug/L	0.19	1
12/23/2009	20:54		(EPA 8081A)	4,4-DDE	ND	ug/L	0.19	1
12/23/2009	20:54		(EPA 8081A)	4,4-DDT	ND	ug/L	0.19	1
12/23/2009	20:54		(EPA 8081A)	Aldrin	ND	ug/L	0.095	1
12/23/2009	20:54		(EPA 8081A)	alpha-BHC	ND	ug/L	0.095	1
12/23/2009	20:54		(EPA 8081A)	alpha-Chlordane	ND	ug/L	0.095	1
12/23/2009	20:54		(EPA 8081A)	beta-BHC	ND	ug/L	0.095	1
12/23/2009	20:54		(EPA 8081A)	delta-BHC	ND	ug/L	0.095	1
12/23/2009	20:54		(EPA 8081A)	Dieldrin	ND	ug/L	0.19	1
12/23/2009	20:54		(EPA 8081A)	Endosulfan I	ND	ug/L	0.095	1
12/23/2009	20:54		(EPA 8081A)	Endosulfan II	ND	ug/L	0.19	1
12/23/2009	20:54		(EPA 8081A)	Endosulfan Sulfate	ND	ug/L	0.19	1
12/23/2009	20:54		(EPA 8081A)	Endrin	ND	ug/L	0.19	1



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Laboratory Data
Report: 321481

MWH Americas - Arcadia

Sarah Garber
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Suite 200
Arcadia, CA 91007

Samples Received on:
12/15/2009

Prepared	Analyzed	QC Ref #	Method	Analyte	Result	Units	MRL	Dilution
	12/23/2009	20:54	(EPA 8081A)	Endrin Aldehyde	ND	ug/L	0.19	1
	12/23/2009	20:54	(EPA 8081A)	Endrin Ketone	ND	ug/L	0.19	1
	12/23/2009	20:54	(EPA 8081A)	gamma-BHC (Lindane)	ND	ug/L	0.095	1
	12/23/2009	20:54	(EPA 8081A)	gamma-Chlordane	ND	ug/L	0.095	1
	12/23/2009	20:54	(EPA 8081A)	Heptachlor	ND	ug/L	0.095	1
	12/23/2009	20:54	(EPA 8081A)	Heptachlor Epoxide	ND	ug/L	0.095	1
	12/23/2009	20:54	(EPA 8081A)	Methoxychlor	ND	ug/L	0.95	1
	12/23/2009	20:54	(EPA 8081A)	Toxaphene	ND	ug/L	1.9	1
	12/23/2009	20:54	(EPA 8081A)	Decachlorobiphenyl	79	%		1
	12/23/2009	20:54	(EPA 8081A)	Tetrachloro-m-xylene	75	%		1
EPA 625 - Diazinon & Chlorpyrifos by EPA 625								
12/18/2009	01/06/2010	00:00	(EPA 625)	Chlorpyrifos	ND	ng/L	2	1
12/18/2009	01/06/2010	00:00	(EPA 625)	Diazinon	ND	ng/L	4	1
EPA 351.2 - Total Kjeldahl Nitrogen								
	12/23/2009	17:41	535947 (EPA 351.2)	Kjeldahl Nitrogen	11	mg/L	1	5
EPA 350.1 - Ammonia Nitrogen								
	12/18/2009	14:09	535415 (EPA 350.1)	Ammonia Nitrogen	0.37	mg/L	0.05	1
SM 9221C - Fecal Coliform Bacteria								
	12/15/2009	17:30	535510 (SM 9221C)	Fecal Coliform Bacteria	16000	MPN/100 mL	2	1
SM 9221B - Total Coliform Bacteria								
	12/15/2009	17:30	535507 (SM 9221B)	Total Coliform Bacteria	5000000	MPN/100 mL	2	1
SM 4500-CL G - Total Chlorine Residual								
	12/16/2009	00:00	535611 (SM 4500-CL G)	Total Chlorine Residual	ND	mg/L	0.1	1
EPA 547 - Glyphosate								
	12/16/2009	13:20	535178 (EPA 547)	Glyphosate	ND	ug/L	6	1
EPA 300.0 - Nitrate, Nitrite by EPA 300.0								
	12/16/2009	00:22	535014 (EPA 300.0)	Nitrate as Nitrogen by IC	0.81	mg/L	0.1	1
	12/16/2009	00:22	535014 (EPA 300.0)	Nitrate as NO3 (calc)	3.5	mg/L	0.44	1
	12/16/2009	00:22	535014 (EPA 300.0)	Nitrite Nitrogen by IC	0.076	mg/L	0.05	1
SM4500-PE/EPA 365.1 - Total phosphorus as P (T-P)								
	12/18/2009	14:12	535404 (SM4500-PE/EPA 365.1)	Total phosphorus as P	4.4	mg/L	0.2	10
4500P-E/365.1 - Orthophosphate as PO4 (CAL)								
	:	:	(4500P-E/365.1)	Orthophosphate as PO4	2.9	mg/L	0.031	1
EPA 180.1 - Turbidity								

Rounding on totals after summation.
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Laboratory Data
Report: 321481

MWH Americas - Arcadia

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Samples Received on:
12/15/2009

Prepared	Analyzed	QC Ref #	Method	Analyte	Result	Units	MRL	Dilution	
	12/16/2009	16:00	535204	(EPA 180.1)	Turbidity	1900	NTU	2.5	50
4500P-E/365.1 - Orthophosphate as P (OPO4)									
	12/16/2009	16:07	535443	(4500P-E/365.1)	Orthophosphate as P	0.95	mg/L	0.05	5

TJPOUT121509 (200912150271)

Sampled on 12/15/2009 1350

EPA 8081A - Organochlorine Pesticides

12/23/2009	21:17		(EPA 8081A)	4,4-DDD	ND	ug/L	0.19	1
12/23/2009	21:17		(EPA 8081A)	4,4-DDE	ND	ug/L	0.19	1
12/23/2009	21:17		(EPA 8081A)	4,4-DDT	ND	ug/L	0.19	1
12/23/2009	21:17		(EPA 8081A)	Aldrin	ND	ug/L	0.095	1
12/23/2009	21:17		(EPA 8081A)	alpha-BHC	ND	ug/L	0.095	1
12/23/2009	21:17		(EPA 8081A)	alpha-Chlordane	ND	ug/L	0.095	1
12/23/2009	21:17		(EPA 8081A)	beta-BHC	ND	ug/L	0.095	1
12/23/2009	21:17		(EPA 8081A)	delta-BHC	ND	ug/L	0.095	1
12/23/2009	21:17		(EPA 8081A)	Dieldrin	ND	ug/L	0.19	1
12/23/2009	21:17		(EPA 8081A)	Endosulfan I	ND	ug/L	0.095	1
12/23/2009	21:17		(EPA 8081A)	Endosulfan II	ND	ug/L	0.19	1
12/23/2009	21:17		(EPA 8081A)	Endosulfan Sulfate	ND	ug/L	0.19	1
12/23/2009	21:17		(EPA 8081A)	Endrin	ND	ug/L	0.19	1
12/23/2009	21:17		(EPA 8081A)	Endrin Aldehyde	ND	ug/L	0.19	1
12/23/2009	21:17		(EPA 8081A)	Endrin Ketone	ND	ug/L	0.19	1
12/23/2009	21:17		(EPA 8081A)	gamma-BHC (Lindane)	ND	ug/L	0.095	1
12/23/2009	21:17		(EPA 8081A)	gamma-Chlordane	ND	ug/L	0.095	1
12/23/2009	21:17		(EPA 8081A)	Heptachlor	ND	ug/L	0.095	1
12/23/2009	21:17		(EPA 8081A)	Heptachlor Epoxide	ND	ug/L	0.095	1
12/23/2009	21:17		(EPA 8081A)	Methoxychlor	ND	ug/L	0.95	1
12/23/2009	21:17		(EPA 8081A)	Toxaphene	ND	ug/L	1.9	1
12/23/2009	21:17		(EPA 8081A)	Decachlorobiphenyl	91	%		1
12/23/2009	21:17		(EPA 8081A)	Tetrachloro-m-xylene	92	%		1

EPA 625 - Diazinon & Chlorpyrifos by EPA 625

12/18/2009	01/06/2010	00:00	(EPA 625)	Chlorpyrifos	ND	ng/L	2	1
12/18/2009	01/06/2010	00:00	(EPA 625)	Diazinon	ND	ng/L	4	1

EPA 351.2 - Total Kjeldahl Nitrogen

12/23/2009	15:46	535947	(EPA 351.2)	Kjeldahl Nitrogen	ND	mg/L	0.2	1
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EPA 350.1 - Ammonia Nitrogen

Rounding on totals after summation.
(c) - indicates calculated results



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Laboratory Data
Report: 321481

MWH Americas - Arcadia

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618 Michillinda Ave.
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Samples Received on:
12/15/2009

Prepared	Analyzed	QC Ref #	Method	Analyte	Result	Units	MRL	Dilution
	12/18/2009 14:03	535415	(EPA 350.1)	Ammonia Nitrogen	ND	mg/L	0.05	1
SM 9221C - Fecal Coliform Bacteria								
	12/15/2009 17:30	535510	(SM 9221C)	Fecal Coliform Bacteria	13	MPN/100 mL	2	1
SM 9221B - Total Coliform Bacteria								
	12/15/2009 17:30	535507	(SM 9221B)	Total Coliform Bacteria	2000	MPN/100 mL	2	1
SM 4500-CL G - Total Chlorine Residual								
	12/16/2009 00:00	535611	(SM 4500-CL G)	Total Chlorine Residual	ND	mg/L	0.1	1
EPA 547 - Glyphosate								
	12/16/2009 13:31	535178	(EPA 547)	Glyphosate	ND	ug/L	6	1
EPA 300.0 - Nitrate, Nitrite by EPA 300.0								
	12/15/2009 22:19	535014	(EPA 300.0)	Nitrate as Nitrogen by IC	6.0	mg/L	0.2	2
	12/15/2009 22:19	535014	(EPA 300.0)	Nitrate as NO3 (calc)	26	mg/L	0.88	2
	12/15/2009 22:19	535014	(EPA 300.0)	Nitrite Nitrogen by IC	ND	mg/L	0.1	2
SM4500-PE/EPA 365.1 - Total phosphorus as P (T-P)								
	12/18/2009 13:43	535404	(SM4500-PE/EPA 365.1)	Total phosphorus as P	ND	mg/L	0.02	1
4500P-E/365.1 - Orthophosphate as PO4 (CAL)								
	:		(4500P-E/365.1)	Orthophosphate as PO4	0.092	mg/L	0.031	1
EPA 180.1 - Turbidity								
	12/16/2009 16:04	535204	(EPA 180.1)	Turbidity	0.34	NTU	0.05	1
4500P-E/365.1 - Orthophosphate as P (OPO4)								
	12/16/2009 16:11	535443	(4500P-E/365.1)	Orthophosphate as P	0.030	mg/L	0.01	1

TJPIN121509 (200912150272)

Sampled on 12/15/2009 1420

EPA 8081A - Organochlorine Pesticides

12/23/2009 21:41	(EPA 8081A)	4,4-DDD	ND	ug/L	0.19	1
12/23/2009 21:41	(EPA 8081A)	4,4-DDE	ND	ug/L	0.19	1
12/23/2009 21:41	(EPA 8081A)	4,4-DDT	ND	ug/L	0.19	1
12/23/2009 21:41	(EPA 8081A)	Aldrin	ND	ug/L	0.096	1
12/23/2009 21:41	(EPA 8081A)	alpha-BHC	ND	ug/L	0.096	1
12/23/2009 21:41	(EPA 8081A)	alpha-Chlordane	ND	ug/L	0.096	1
12/23/2009 21:41	(EPA 8081A)	beta-BHC	ND	ug/L	0.096	1
12/23/2009 21:41	(EPA 8081A)	delta-BHC	ND	ug/L	0.096	1
12/23/2009 21:41	(EPA 8081A)	Dieldrin	ND	ug/L	0.19	1
12/23/2009 21:41	(EPA 8081A)	Endosulfan I	ND	ug/L	0.096	1

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Laboratory Data
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MWH Americas - Arcadia

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 Arcadia, CA 91007

Samples Received on:
 12/15/2009

Prepared	Analyzed	QC Ref #	Method	Analyte	Result	Units	MRL	Dilution
	12/23/2009	21:41	(EPA 8081A)	Endosulfan II	ND	ug/L	0.19	1
	12/23/2009	21:41	(EPA 8081A)	Endosulfan Sulfate	ND	ug/L	0.19	1
	12/23/2009	21:41	(EPA 8081A)	Endrin	ND	ug/L	0.19	1
	12/23/2009	21:41	(EPA 8081A)	Endrin Aldehyde	ND	ug/L	0.19	1
	12/23/2009	21:41	(EPA 8081A)	Endrin Ketone	ND	ug/L	0.19	1
	12/23/2009	21:41	(EPA 8081A)	gamma-BHC (Lindane)	ND	ug/L	0.096	1
	12/23/2009	21:41	(EPA 8081A)	gamma-Chlordane	ND	ug/L	0.096	1
	12/23/2009	21:41	(EPA 8081A)	Heptachlor	ND	ug/L	0.096	1
	12/23/2009	21:41	(EPA 8081A)	Heptachlor Epoxide	ND	ug/L	0.096	1
	12/23/2009	21:41	(EPA 8081A)	Methoxychlor	ND	ug/L	0.96	1
	12/23/2009	21:41	(EPA 8081A)	Toxaphene	ND	ug/L	1.9	1
	12/23/2009	21:41	(EPA 8081A)	Decachlorobiphenyl	91	%		1
	12/23/2009	21:41	(EPA 8081A)	Tetrachloro-m-xylene	88	%		1
EPA 625 - Diazinon & Chlorpyrifos by EPA 625								
12/18/2009	01/06/2010	00:00	(EPA 625)	Chlorpyrifos	ND	ng/L	2	1
12/18/2009	01/06/2010	00:00	(EPA 625)	Diazinon	ND	ng/L	4	1
EPA 351.2 - Total Kjeldahl Nitrogen								
	12/23/2009	15:47	535947 (EPA 351.2)	Kjeldahl Nitrogen	ND	mg/L	0.2	1
EPA 350.1 - Ammonia Nitrogen								
	12/21/2009	18:49	535735 (EPA 350.1)	Ammonia Nitrogen	ND	mg/L	0.05	1
SM 9221C - Fecal Coliform Bacteria								
	12/15/2009	17:30	535510 (SM 9221C)	Fecal Coliform Bacteria	30	MPN/100 mL	2	1
SM 9221B - Total Coliform Bacteria								
	12/15/2009	17:30	535507 (SM 9221B)	Total Coliform Bacteria	800	MPN/100 mL	2	1
SM 4500-CL G - Total Chlorine Residual								
	12/16/2009	00:00	535611 (SM 4500-CL G)	Total Chlorine Residual	ND	mg/L	0.1	1
EPA 547 - Glyphosate								
	12/16/2009	13:42	535178 (EPA 547)	Glyphosate	ND	ug/L	6	1
EPA 300.0 - Nitrate, Nitrite by EPA 300.0								
	12/15/2009	23:41	535014 (EPA 300.0)	Nitrate as Nitrogen by IC	7.9	mg/L	0.2	2
	12/15/2009	23:41	535014 (EPA 300.0)	Nitrate as NO3 (calc)	35	mg/L	0.88	2
	12/15/2009	23:41	535014 (EPA 300.0)	Nitrite Nitrogen by IC	ND	mg/L	0.1	2
SM4500-PE/EPA 365.1 - Total phosphorus as P (T-P)								
	12/18/2009	13:44	535404 (SM4500-PE/EPA 365.1)	Total phosphorus as P	0.029	mg/L	0.02	1

Rounding on totals after summation.
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MWH Americas - Arcadia

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Laboratory Data
 Report: 321481

Samples Received on:
 12/15/2009

Prepared	Analyzed	QC Ref #	Method	Analyte	Result	Units	MRL	Dilution
4500P-E/365.1 - Orthophosphate as PO4 (CAL)								
			(4500P-E/365.1)	Orthophosphate as PO4	0.12	mg/L	0.031	1
EPA 180.1 - Turbidity								
12/16/2009	16:05	535204	(EPA 180.1)	Turbidity	0.73	NTU	0.05	1
4500P-E/365.1 - Orthophosphate as P (OPO4)								
12/16/2009	16:09	535443	(4500P-E/365.1)	Orthophosphate as P	0.038	mg/L	0.01	1



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Laboratory
QC Summary: 321481

MWH Americas - Arcadia

QC Ref # 535014 - Nitrate, Nitrite by EPA 300.0

200912150269 HCC121509
200912150270 BTW121509
200912150271 TJPOUT121509
200912150272 TJPIN121509

Analysis Date: 12/15/2009

Analyzed by: S XK
Analyzed by: S XK
Analyzed by: S XK
Analyzed by: S XK

QC Ref # 535178 - Glyphosate

200912150269 HCC121509
200912150270 BTW121509
200912150271 TJPOUT121509
200912150272 TJPIN121509

Analysis Date: 12/16/2009

Analyzed by: S Z Z
Analyzed by: S Z Z
Analyzed by: S Z Z
Analyzed by: S Z Z

QC Ref # 535204 - Turbidity

200912150269 HCC121509
200912150270 BTW121509
200912150271 TJPOUT121509
200912150272 TJPIN121509

Analysis Date: 12/16/2009

Analyzed by: N E M
Analyzed by: N E M
Analyzed by: N E M
Analyzed by: N E M

QC Ref # 535404 - Total phosphorus as P (T-P)

200912150269 HCC121509
200912150270 BTW121509
200912150271 TJPOUT121509
200912150272 TJPIN121509

Analysis Date: 12/18/2009

Analyzed by: N J R
Analyzed by: N J R
Analyzed by: N J R
Analyzed by: N J R

QC Ref # 535415 - Ammonia Nitrogen

200912150269 HCC121509
200912150270 BTW121509
200912150271 TJPOUT121509

Analysis Date: 12/18/2009

Analyzed by: N I N A
Analyzed by: N I N A
Analyzed by: N I N A

QC Ref # 535443 - Orthophosphate as P (OPO4)

200912150269 HCC121509
200912150270 BTW121509
200912150271 TJPOUT121509
200912150272 TJPIN121509

Analysis Date: 12/16/2009

Analyzed by: K C L
Analyzed by: K C L
Analyzed by: K C L
Analyzed by: K C L

QC Ref # 535507 - Total Coliform Bacteria

200912150269 HCC121509
200912150270 BTW121509
200912150271 TJPOUT121509
200912150272 TJPIN121509

Analysis Date: 12/15/2009

Analyzed by: G P M
Analyzed by: G P M
Analyzed by: G P M
Analyzed by: G P M

QC Ref # 535510 - Fecal Coliform Bacteria

200912150269 HCC121509
200912150270 BTW121509
200912150271 TJPOUT121509
200912150272 TJPIN121509

Analysis Date: 12/15/2009

Analyzed by: T X M
Analyzed by: T X M
Analyzed by: T X M
Analyzed by: T X M

QC Ref # 535611 - Total Chlorine Residual

200912150269 HCC121509
200912150270 BTW121509

Analysis Date: 12/16/2009

Analyzed by: M A V
Analyzed by: M A V



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1 800 566 LABS (1 800 566 5227)

Laboratory
QC Summary: 321481

MWH Americas - Arcadia

(continued)

200912150271	TJPOUT121509	Analyzed by: MAV
200912150272	TJPIN121509	Analyzed by: MAV

QC Ref # 535735 - Ammonia Nitrogen

Analysis Date: 12/21/2009

200912150272	TJPIN121509	Analyzed by: NJR
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QC Ref # 535947 - Total Kjeldahl Nitrogen

Analysis Date: 12/23/2009

200912150269	HCC121509	Analyzed by: NJR
200912150270	BTW121509	Analyzed by: NJR
200912150271	TJPOUT121509	Analyzed by: NJR
200912150272	TJPIN121509	Analyzed by: NJR



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Laboratory
QC Report: 321481

MWH Americas - Arcadia

QC Type	Analyte	Native	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPDLimit (%)	RPD%
QC Ref# 535014 - Nitrate, Nitrite by EPA 300.0 by EPA 300.0					Analysis Date: 12/15/2009				
LCS1	Nitrate as Nitrogen by IC		2.5	2.45	mg/L	98	(90-110)		
LCS2	Nitrate as Nitrogen by IC		2.5	2.45	mg/L	98	(90-110)	20	0.0
MBLK	Nitrate as Nitrogen by IC			<0.10	mg/L				
MRL_CHK	Nitrate as Nitrogen by IC		0.05	0.0509	mg/L	102	(50-150)		
MS_200912150272	Nitrate as Nitrogen by IC	7.9	1.3	10.3	mg/L	99	(90-110)		
MS_200912160212	Nitrate as Nitrogen by IC	4.4	1.3	7.05	mg/L	105	(90-110)		
MSD_200912150272	Nitrate as Nitrogen by IC	7.9	1.3	10.4	mg/L	100	(90-110)	20	0.60
MSD_200912160212	Nitrate as Nitrogen by IC	4.4	1.3	7.07	mg/L	106	(90-110)	20	0.95
LCS1	Nitrite Nitrogen by IC		1.0	0.926	mg/L	93	(90-110)		
LCS2	Nitrite Nitrogen by IC		1.0	0.926	mg/L	93	(90-110)	20	0.0
MBLK	Nitrite Nitrogen by IC			<0.10	mg/L				
MRL_CHK	Nitrite Nitrogen by IC		0.05	0.0491	mg/L	98	(50-150)		
MS_200912150272	Nitrite Nitrogen by IC	ND	0.5	1.02	mg/L	98	(90-110)		
MS_200912160212	Nitrite Nitrogen by IC	ND	0.5	0.818	mg/L	<u>82</u>	(90-110)		
MSD_200912150272	Nitrite Nitrogen by IC	ND	0.5	1.02	mg/L	98	(90-110)	20	0.61
MSD_200912160212	Nitrite Nitrogen by IC	ND	0.5	0.857	mg/L	<u>86</u>	(90-110)	20	4.7
QC Ref# 535178 - Glyphosate by EPA 547					Analysis Date: 12/16/2009				
CCCM	Glyphosate		10	8.43	ug/L	84	(70-130)		
LCS1	Glyphosate		10	8.98	ug/L	90	(80-120)		
MBLK	Glyphosate			<6	ug/L				
MRL_CHK	Glyphosate		6.0	5.28	ug/L	88	(50-150)		
MS_200912150269	Glyphosate	ND	10	14.5	ug/L	88	(83-119)		
MSD_200912150269	Glyphosate	ND	10	14.7	ug/L	89	(83-119)	20	1.8
QC Ref# 535204 - Turbidity by EPA 180.1					Analysis Date: 12/16/2009				
DUP_200912150428	Turbidity	0.070		0.0730	NTU		(0-10)		
DUP2_200912160008	Turbidity	0.10		0.105	NTU		(0-10)		
LCS1	Turbidity		20	20.4	NTU	102	(90-110)		
LCS2	Turbidity		20	20.3	NTU	102	(90-110)	20	0.49
MBLK	Turbidity			<0.05	NTU				
MRL_CHK	Turbidity		0.05	0.0520	NTU	104	(50-150)		
QC Ref# 535404 - Total phosphorus as P (T-P) by SM4500-PE/EPA 365.1					Analysis Date: 12/18/2009				
LCS1	Total phosphorus as P		0.4	0.362	mg/L	91	(90-110)		
LCS2	Total phosphorus as P		0.4	0.364	mg/L	91	(90-110)	20	0.55
MBLK	Total phosphorus as P			<0.02	mg/L				
MRL_CHK	Total phosphorus as P		0.02	0.0249	mg/L	125	(50-150)		

Spike recovery is already corrected for native results.

Spikes which exceed Limits and Method Blanks with positive results are highlighted by Underlining.

Criteria for MS and Dup are advisory only, batch control is based on LCS. Criteria for duplicates

are advisory only, unless otherwise specified in the method.

(S) Indicates surrogate compound.

17/46

(I) Indicates internal standard compound.

RPD not calculated for LCS2 when different a concentration than LCS1 is used

RPD not calculated for Duplicates when the result is not five times the MRL (Minimum Reporting Level)



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Laboratory
QC Report: 321481

MWH Americas - Arcadia
(continued)

QC Type	Analyte	Native	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPDLimit (%)	RPD%
MS_200912110083	Total phosphorus as P	0.19	0.4	0.587	mg/L	101	(90-110)		
MS2_200912110085	Total phosphorus as P	0.46	0.4	0.874	mg/L	105	(90-110)		
MSD_200912110083	Total phosphorus as P	0.19	0.4	0.581	mg/L	99	(90-110)	20	2.0
QC Ref# 535415 - Ammonia Nitrogen by EPA 350.1					Analysis Date: 12/18/2009				
LCS1	Ammonia Nitrogen		1.0	1.03	mg/L	103	(90-110)		
LCS2	Ammonia Nitrogen		1.0	1.02	mg/L	102	(90-110)	20	0.98
MBLK	Ammonia Nitrogen			<0.05	mg/L				
MRL_CHK	Ammonia Nitrogen		0.05	0.0477	mg/L	95	(50-150)		
MS_200912150343	Ammonia Nitrogen	0.072	1.0	1.09	mg/L	102	(90-110)		
MSD_200912150343	Ammonia Nitrogen	0.072	1.0	1.09	mg/L	102	(90-110)	20	0.0
QC Ref# 535443 - Orthophosphate as P (OPO4) by 4500P-E/365.1					Analysis Date: 12/16/2009				
LCS1	Orthophosphate as P		0.25	0.253	mg/L	101	(90-110)		
LCS2	Orthophosphate as P		0.25	0.245	mg/L	98	(90-110)	20	3.2
MBLK	Orthophosphate as P			<0.01	mg/L				
MRL_CHK	Orthophosphate as P		0.01	0.00700	mg/L	70	(50-150)		
MS_200912160158	Orthophosphate as P	0.39	0.5	0.885	mg/L	99	(90-110)		
MS2_200912160367	Orthophosphate as P	0.14	0.5	0.664	mg/L	105	(90-110)		
MSD_200912160158	Orthophosphate as P	0.39	0.5	0.898	mg/L	102	(90-110)	20	2.8
QC Ref# 535735 - Ammonia Nitrogen by EPA 350.1					Analysis Date: 12/21/2009				
LCS1	Ammonia Nitrogen		1.0	1.04	mg/L	104	(90-110)		
LCS2	Ammonia Nitrogen		1.0	1.05	mg/L	105	(90-110)	20	0.96
MBLK	Ammonia Nitrogen			<0.05	mg/L				
MRL_CHK	Ammonia Nitrogen		0.05	0.0420	mg/L	84	(50-150)		
MS_200912170361	Ammonia Nitrogen	0.18	1.0	1.24	mg/L	106	(90-110)		
MS2_200912170362	Ammonia Nitrogen	0.21	1.0	1.26	mg/L	105	(90-110)		
MSD_200912170361	Ammonia Nitrogen	0.18	1.0	1.25	mg/L	107	(90-110)	20	0.94
QC Ref# 535947 - Total Kjeldahl Nitrogen by EPA 351.2					Analysis Date: 12/23/2009				
LCS1	Kjeldahl Nitrogen		4.0	3.86	mg/L	97	(90-110)		
LCS2	Kjeldahl Nitrogen		4.0	3.93	mg/L	98	(90-110)	20	1.8
MBLK	Kjeldahl Nitrogen			<0.1	mg/L				
MRL_CHK	Kjeldahl Nitrogen		0.2	0.215	mg/L	108	(50-150)		
MS_200912170361	Kjeldahl Nitrogen	0.30	4.0	4.18	mg/L	97	(90-110)		
MS2_200912170362	Kjeldahl Nitrogen	0.35	4.0	4.21	mg/L	97	(90-110)		
MSD_200912170361	Kjeldahl Nitrogen	0.30	4.0	4.17	mg/L	97	(90-110)	20	0.31

Spike recovery is already corrected for native results.

Spikes which exceed Limits and Method Blanks with positive results are highlighted by Underlining.

Criteria for MS and Dup are advisory only, batch control is based on LCS. Criteria for duplicates

are advisory only, unless otherwise specified in the method.

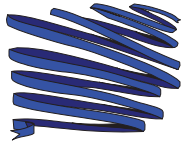
(S) Indicates surrogate compound.

18/46

(I) Indicates internal standard compound.

RPD not calculated for LCS2 when different a concentration than LCS1 is used

RPD not calculated for Duplicates when the result is not five times the MRL (Minimum Reporting Level)



CRG

Marine
Laboratories, Inc.

"A Center for Excellence in Analytical Chemistry and Environmental Microbiology"

January 12, 2010

MWH Laboratories
750 Royal Oaks Dr., Suite 100
Monrovia, CA 91016

Re: CRG Marine Laboratories
MWH Laboratories

Project ID: MWH006-09
Project ID: Project # 321481

ATTN: Christine Lewis

CRG Laboratories is pleased to provide you with the enclosed analytical data report for your Project # 321481 project. According to the chain-of-custody, 4 samples were received intact at CRG on 12/17/2009. Per your instructions, the samples were analyzed for:

- Organophosphorus Pesticides By GCMS Using Method EPA 625m

Please don't hesitate to call if you have any questions and thank you very much for using our laboratory for your analytical needs.

Regards,
Karen Tuttle

Reviewed and Approved _____

Project Sample List

MWH Laboratories

CRG Project ID: **MWH006-09**

Project Officer: Christine Lewis

Project Description: Project # 321481

<i>CRG Sample ID#</i>	<i>Client Sample ID</i>	<i>Sample Description</i>	<i>Date Sampled</i>	<i>Matrix</i>
92411	200912150269	HCC121509	15-Dec-09	Water
92412	200912150270	BTW121509	15-Dec-09	Water
92413	200912150271	TJPOUT121509	15-Dec-09	Water
92414	200912150272	TJPIN121509	15-Dec-09	Water

CRG's QUALITY ASSURANCE

PROGRAM SUMMARY

BATCH: CRG's Quality Assurance Program Document defines a batch as a group of 20 or fewer samples of similar matrix, processed together under the same conditions and with the same reagents. Quality control samples are associated with each batch and are used to assess the validity of the sample analyses. CRG typically uses batch sizes of 10-15 samples.

PROCEDURAL BLANKS: Laboratory contamination was controlled through the analysis of procedural blanks on a minimum frequency of 1 per batch. CRG's Quality Assurance Program Document requires that all procedural blanks be below 10 times the MDL and all detectable constituents in the blanks be flagged in the sample results. The Procedural Blanks are presented in the Procedural Blank section of this report.

ACCURACY: Accuracy of the project data was indicated by analysis of matrix spikes (MS/MSD), surrogate spikes, certified reference materials, positive controls, and/or laboratory control materials on a minimum frequency of 1 per batch. CRG's Quality Assurance Program Document requires that 95% of the target compounds greater than 10 times the MDL be within the specified acceptance limits. The Acceptance Ranges are presented in the Accuracy Data section of this report.

PRECISION: Precision of the project data was determined by analysis of duplicate matrix spikes, blank spikes, and/or duplicate test sample analysis on a minimum frequency of 1 per batch. CRG's Quality Assurance Program Document requires that for 95% of the compounds >10 times the MDL, the % Relative Percent Difference (%RPD) should be within the specified acceptance range. The %RPD for the duplicate test sample analysis can be significantly affected by the homogeneity of the sample matrix within the sample container itself causing additional variability in the analytical results. In these cases, the QA/QC Acceptance Limits may be exceeded. The %RPD and Acceptance Ranges are presented in the Precision Data section of this report.

TOTAL/DISSOLVED: In some instances, the results for the "Dissolved" fraction can be higher than the "Total" fraction for a particular parameter. This is typically caused by the analytical variation for each result and indicates that the target parameter is primarily in the dissolved phase.

GLOSSARY OF TERMS

<u>Qualifier</u>	<u>Definition</u>
B	Analyte was detected in the associated method blank.
E	Analyte concentration exceeds the calibration range
H	Sample received and/or analyzed past the recommended holding time.
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
M1	Recovery of the MS and/or MSD compound was out of control due to matrix interference.
M2	The MS/MSD RPD was out of control due to matrix interference.
M3	Detection of the analyte was difficult due to matrix interference.
M4	Spike or surrogate compound recovery was out of control due to matrix interference. The associated method blank spike or surrogate compound was in control and therefore the sample data was reported without further clarification.

M5	Recovery of the MS and/or MSD compound was out of control due to an unknown compound(s) in the sample that interferes with the known target compound causing an increased response.
M6	Recovery of the MS and/or MSD compound was out of control due to unknown heavy hydrocarbons detected in the sample which elevates the baseline.
ND or U NES	Parameter not detected at the indicated reporting limit. Not enough sample.
Q1	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration.
Q2	The sample RPD was out of control. Sample is heterogeneous and sample homogeneity could not be readily achieved using routine laboratory practices.
Q3	RPD values are not accurate and not applicable because the results for R1 and/or R2 are lower than 10 times the MDL.
Q4	Due to the sample rate of the instrument, the peak area was underestimated because the apex of the peak was missed. This random error has caused this compound to fail for the spike and/or precision. This failure does not indicate any significant problems with the analysis of this sample and the data passes CRG's QAPP requirements.
Q5	Precision failed due to one of the sample extractions having lower recoveries than the duplicate.
Q6	CRG's Quality Assurance Program Document allows for 5% of the target compounds greater than 10 times the MDL to be outside the specified acceptance limits for precision and/or accuracy. This is often due to random error and cannot be attributed to a specific issue.
Q7	Toxaphene results are based on a commercial Toxaphene mixture of unknown composition and therefore the concentrations listed in this report are estimated.
Q8	The result for the constituent is similar to what is seen with inadvertent sample contamination in the lab during preparation. Unfortunately, either the holding time has expired and/or there was no more sample to re-extract.
Q9	The recovery of the BS1 and/or BS2 compound was below the method control limits. Results for this compound may be biased low.

DATA REPORT

CRG Marine Laboratories, Inc.

2020 Del Amo Blvd., Suite 200, Torrance, CA 90501-1206 (310) 533-5190 FAX (310) 533-5003

Organophosphorus Pesticides

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
92411-R1	200912150269HCC121509				Water	Sampled: 15-Dec-09	13:59			Received: 17-Dec-09
(PCB030)	Total	91			% Recovery	53073	12/18/2009	1/6/2010	EPA 625m	
(PCB112)	Total	100			% Recovery	53073	12/18/2009	1/6/2010	EPA 625m	
(PCB198)	Total	103			% Recovery	53073	12/18/2009	1/6/2010	EPA 625m	
(TCMX)	Total	86			% Recovery	53073	12/18/2009	1/6/2010	EPA 625m	
Chlorpyrifos	Total	ND	1	2	ng/L	53073	12/18/2009	1/6/2010	EPA 625m	
Diazinon	Total	ND	2	4	ng/L	53073	12/18/2009	1/6/2010	EPA 625m	
92412-R1	200912150270BTW121509				Water	Sampled: 15-Dec-09	11:50			Received: 17-Dec-09
(PCB030)	Total	80			% Recovery	53073	12/18/2009	1/6/2010	EPA 625m	
(PCB112)	Total	88			% Recovery	53073	12/18/2009	1/6/2010	EPA 625m	
(PCB198)	Total	94			% Recovery	53073	12/18/2009	1/6/2010	EPA 625m	
(TCMX)	Total	80			% Recovery	53073	12/18/2009	1/6/2010	EPA 625m	
Chlorpyrifos	Total	ND	1	2	ng/L	53073	12/18/2009	1/6/2010	EPA 625m	
Diazinon	Total	ND	2	4	ng/L	53073	12/18/2009	1/6/2010	EPA 625m	
92413-R1	200912150271TJPOUT121509				Water	Sampled: 15-Dec-09	13:50			Received: 17-Dec-09
(PCB030)	Total	85			% Recovery	53073	12/18/2009	1/6/2010	EPA 625m	
(PCB112)	Total	95			% Recovery	53073	12/18/2009	1/6/2010	EPA 625m	
(PCB198)	Total	100			% Recovery	53073	12/18/2009	1/6/2010	EPA 625m	
(TCMX)	Total	78			% Recovery	53073	12/18/2009	1/6/2010	EPA 625m	
Chlorpyrifos	Total	ND	1	2	ng/L	53073	12/18/2009	1/6/2010	EPA 625m	
Diazinon	Total	ND	2	4	ng/L	53073	12/18/2009	1/6/2010	EPA 625m	
92414-R1	200912150272TJPIN121509				Water	Sampled: 15-Dec-09	14:20			Received: 17-Dec-09
(PCB030)	Total	84			% Recovery	53073	12/18/2009	1/6/2010	EPA 625m	
(PCB112)	Total	94			% Recovery	53073	12/18/2009	1/6/2010	EPA 625m	

MWH006-09 Project # 321481

CRG Marine Laboratories, Inc.

2020 Del Amo Blvd., Suite 200, Torrance, CA 90501-1206 (310) 533-5190 FAX (310) 533-5003

Organophosphorus Pesticides

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
(PCB198)	Total	99			% Recovery	53073	12/18/2009	1/6/2010	EPA 625m	
(TCMX)	Total	77			% Recovery	53073	12/18/2009	1/6/2010	EPA 625m	
Chlorpyrifos	Total	ND	1	2	ng/L	53073	12/18/2009	1/6/2010	EPA 625m	
Diazinon	Total	ND	2	4	ng/L	53073	12/18/2009	1/6/2010	EPA 625m	

QUALITY CONTROL REPORT

CRG Marine Laboratories, Inc.

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Organophosphorus Pesticides

QUALITY CONTROL REPORT

Analyte	Fraction	Batch ID	Result	MDL	RL	Units	Spike Level	Source Result	% Recovery	Acceptance Limits	Limit Pass/Fail	RPD LIMIT	RPD LIMIT	Limit Pass/Fail	QA Code
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Prepared 12/18/2009 Analyzed 06-Jan-10

QAQC Procedural Blank
DI Water

Lab Blank	92410-B1														
(PCB030)	Total	53073	91			% Recovery	100		91	41 - 139%	PASS				
(PCB112)	Total	53073	100			% Recovery	100		100	52 - 144%	PASS				
(PCB198)	Total	53073	104			% Recovery	100		104	55 - 146%	PASS				
(TCMX)	Total	53073	85			% Recovery	100		85	27 - 140%	PASS				
Chlorpyrifos	Total	53073	ND	1	2	ng/L									
Diazinon	Total	53073	ND	2	4	ng/L									

QAQC Procedural Blank
DI Water

Prepared 12/18/2009 Analyzed 06-Jan-10

Blank Spike	92410-BS1														
(PCB030)	Total	53073	86			% Recovery	100	0	86	41 - 139%	PASS				
(PCB112)	Total	53073	94			% Recovery	100	0	94	52 - 144%	PASS				
(PCB198)	Total	53073	105			% Recovery	100	0	105	55 - 146%	PASS				
(TCMX)	Total	53073	80			% Recovery	100	0	80	27 - 140%	PASS				
Chlorpyrifos	Total	53073	321.8	1	2	ng/L	389.2	0	83	55 - 137%	PASS				
Diazinon	Total	53073	304.3	2	4	ng/L	389.2	0	78	56 - 134%	PASS				

QAQC Procedural Blank
DI Water

Prepared 12/18/2009 Analyzed 06-Jan-10

Blank Spike Dup	92410-BS2														
(PCB030)	Total	53073	84			% Recovery	100	0	84	41 - 139%	PASS	2	30	PASS	
(PCB112)	Total	53073	93			% Recovery	100	0	93	52 - 144%	PASS	1	30	PASS	
(PCB198)	Total	53073	101			% Recovery	100	0	101	55 - 146%	PASS	4	30	PASS	
(TCMX)	Total	53073	80			% Recovery	100	0	80	27 - 140%	PASS	0	30	PASS	
Chlorpyrifos	Total	53073	331.6	1	2	ng/L	389.2	0	85	55 - 137%	PASS	2	30	PASS	
Diazinon	Total	53073	313.3	2	4	ng/L	389.2	0	80	56 - 134%	PASS	3	30	PASS	

CHAIN-OF-CUSTODY



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Ship To
 2020 Del Amo Blvd. Suite 200
 CRG Marine Labs
 Torrance, CA 90501-1206

310-533-5190 Fax 310-533-5003

MWH Project # **321481** Report Due: **12/31/2009** Sub PO# **99-02476**

CXL Use MWH Lab Sample # for ID

Client Sample ID for reference only	Analysis Requested	Date & Time Matrix	PWS Systemcode	PWSID
EPA 625 92376	Diazinon & Chlorpyrifos by EPA 625	12/15/09 1359	Water	
EPA 625 92377	Diazinon & Chlorpyrifos by EPA 625	12/15/09 1150	Water	
EPA 625 92378	Diazinon & Chlorpyrifos by EPA 625	12/15/09 1350	Water	
EPA 625 92379	Diazinon & Chlorpyrifos by EPA 625	12/15/09 1420	Water	

Date **12/15/2009**

Submittal Form & Purchase Order **99-02476**

*REPORTING REQUIREMENTS: Do Not Combine Report with any other samples submitted under different MWH project numbers!
 Report & Invoice must have the MWH Project Number 321481 Sub PO# 99-02476 and Job # 1000014

RIID: 1408-09

Report all quality control data according to Method. Include dates analyzed, date extracted (if extracted) and Method reference on the report. Results must have Complete data & QC with Approval Signature. See reverse side for List of Terms and Conditions

Reports: Christine Lewis Sub-Contracting Administrator
 EMAIL TO: mwhlabs-subcontractreports@mwhglobal.com
 MWH Laboratories 750 Royal Oaks Dr. Ste. 100, Monrovia, CA 91016
 Phone (626) 386-1137 Fax (626) 386-1122
 Invoices to: MWH LABORATORIES
 Accounts Payable PO BOX 6610, Broomfield, CO 80021

Provide in each Report the Specified State Certification # & Exp Date for requested tests + matrix.

Samples from the State of: CALIFORNIA

Relinquished by: *[Signature]* Date: 12/16/09 Time: 0800 MUST HAVE NOTIFICATION IF TEMP IS GREATER THAN 6 OR LESS THAN CELSIUS
 Received by: *[Signature]* Date: 12/16/09 Time: 1045 An Acknowledgement of Receipt is requested to attn. Christine Lewis

CRG PID

CRG RID
1408-09

SAMPLE RECEIPT FORM

CLIENT: mwH Date Received: 12/16/09 Total # of Samples: 4

COURIER INFORMATION

CRG OTHER
 CLIENT

FEDEX
 UPS

tracking #

TEMPERATURE

3.7°C WET ICE BLUE ICE NO ICE

SAMPLE MATRIX

LIQUID TISSUE
 Composite at CRG, equal Homogenized
 Composite at CRG, flow-weighted Unhomogenized

CLIENT COC

INCLUDED SIGNED
 NOT INCLUDED NOT SIGNED

SOLID OTHER

Received By:

CONDITION OF SAMPLES UPON VERIFICATION

	Yes	No	NA
All sample containers received intact and in good condition.....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
All samples listed on COC(s) are present.....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
All sample IDs on containers are consistent with sample IDs on COC(s).....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Correct containers used for analyses requested.....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
All samples received within method holding time.....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Samples verified by:

NOTES

Received (1) IL Amber per sample. Report due 12.31.09 - (per coc) SC

TABLE OF CONTENTS

CLIENT: MWH LABORATORIES
PROJECT: 321481
SDG: 09L284

SECTION		PAGE
Cover Letter, COC/Sample Receipt Form		1000 – 1003
GC/MS-VOA	**	2000 –
GC/MS-SVOA	**	3000 –
GC-VOA	**	4000 –
GC-SVOA	METHOD 3520C/8081A	5000 – 5010
HPLC	**	6000 –
METALS	**	7000 –
WET	**	8000 –
OTHERS	**	9000 –

** - Not Requested



LABORATORIES, INC.
 1835 W. 205th Street
 Torrance, CA 90501
 Tel: (310) 618-8889
 Fax: (310) 618-0818

Date: 12-30-2009
 EMAX Batch No.: 09L284

Attn: Christine Lewis

MWH Laboratories
 750 Royal Oaks Dr., Suite 100
 Monrovia CA 91016-3629

Subject: Laboratory Report
 Project: 321481

 Enclosed is the Laboratory report for samples received on 12/16/09.
 The data reported relate only to samples listed below :

Sample ID	Control #	Col Date	Matrix	Analysis
200912150269	L284-01	12/15/09	WATER	PESTICIDES ORGANOCHLORINE
200912150270	L284-02	12/15/09	WATER	PESTICIDES ORGANOCHLORINE
200912150271	L284-03	12/15/09	WATER	PESTICIDES ORGANOCHLORINE
200912150272	L284-04	12/15/09	WATER	PESTICIDES ORGANOCHLORINE

The results are summarized on the following pages.

Please feel free to call if you have any questions concerning these results.

Sincerely yours,

 Caspar J. Pang
 Laboratory Director

This report is confidential and intended solely for the use of the individual or entity to whom it is addressed. This report shall not be reproduced except in full or without the written approval of EMAX.

EMAX certifies that the results included in this report meet all NELAC requirements unless noted in the Case Narrative.



MWH Laboratories
 A Division of MWH Americas, Inc.
 750 Royal Oaks Drive Suite 100
 Monrovia, CA 91016-3629
 Ph (626) 386-1100 Fax (626) 386-1095

Date **12/15/2009**

Submittal Form & Purchase Order 99-02474

***REPORTING REQUIREMENTS: Do Not Combine Report with any other samples submitted under different MWH project numbers!**
 Report & Invoice must have the MWH Project Number 321481 Sub PO# 99-02474 and Job # 1000014

Report all quality control data according to Method. Include dates analyzed, date extracted (if extracted) and Method reference on the report.
 Results must have Complete data & QC with Approval Signature. See reverse side for List of Terms and Conditions

Ship To
1835 West 205th Street
EMAX Laboratories, Inc.
Torrance, CA 90501

Provide in each Report the Specified State Certification # & Exp Date for requested tests
 Samples from the State of CALIFORNIA

09/28/04

310-618-8889 Fax 310-618-0818

MWH Project # **321481** Report Due: **12/31/2009** Sub PO# **99-02474**

Use MWH Lab Sample # for ID

Client Sample ID for reference only	Analysis Requested	Sample Date & Time Matrix	PWS Systemcode	PWSID
200912150269 HCC121509	Organochlorine Pesticides	12/15/09 1359 Water	1	
200912150270 BTW121509	Organochlorine Pesticides	12/15/09 1150 Water	2	
200912150271 TJPOUT121509	Organochlorine Pesticides	12/15/09 1350 Water	3	
200912150272 TJPIN121509	Organochlorine Pesticides	12/15/09 1420 Water	4	

[Signature]

T = 13.7 °C

Sample Control Date 12/16/09 Time 10:00 MUST HAVE NOTIFICATION IF TEMP IS GREATER THAN 6 OR LESS THAN CELSIUS

Received by: [Signature] Date 12/16/09 Time 10:41 An Acknowledgement of Receipt is requested to attn: Christine Lewis



SAMPLE RECEIPT FORM 1

Type of Delivery	Delivered By/Airbill	ECN <u>09/284</u>
<input type="checkbox"/> EMAX Courier	<u>See loc</u>	Recipient <u>J-LUNA</u>
<input type="checkbox"/> Client Delivery		Date <u>12-16-09</u>
<input type="checkbox"/> Third Party		Time <u>1045</u>

COC Inspection

<input checked="" type="checkbox"/> Client Name	<input checked="" type="checkbox"/> Client PM/FC	<input type="checkbox"/> Sampler Name <u>NO</u>	<input checked="" type="checkbox"/> Sampling Date/Time/Location	<input checked="" type="checkbox"/> Sample ID	<input checked="" type="checkbox"/> Matrix
<input type="checkbox"/> Address	<input checked="" type="checkbox"/> Tel # / Fax #	<input type="checkbox"/> Courier Signature	<input checked="" type="checkbox"/> Analysis Required	<input type="checkbox"/> Preservative (if any)	<input type="checkbox"/> TAT
Safety Issues	<input checked="" type="checkbox"/> None	<input type="checkbox"/> High concentrations expected	<input type="checkbox"/> Superfund Site samples	<input type="checkbox"/> Rad screening required	

Comments:

Packaging Inspection

Container	<input checked="" type="checkbox"/> Cooler	<input type="checkbox"/> Box	<input type="checkbox"/> Other
Condition	<input type="checkbox"/> Custody Seal	<input checked="" type="checkbox"/> Intact	<input type="checkbox"/> Damaged
Packaging	<input checked="" type="checkbox"/> Bubble Pack	<input type="checkbox"/> Styrofoam	<input type="checkbox"/> Popcorn
Temperatures (Cool, ≤6 °C but not frozen)	<input checked="" type="checkbox"/> Cooler <u>13.7</u> °C	<input type="checkbox"/> Cooler 2 _____ °C	<input type="checkbox"/> Cooler 3 _____ °C
	<input type="checkbox"/> Cooler 6 _____ °C	<input type="checkbox"/> Cooler 7 _____ °C	<input type="checkbox"/> Cooler 8 _____ °C
		<input type="checkbox"/> Cooler 9 _____ °C	<input type="checkbox"/> Cooler 10 _____ °C

Comments: PM was informed on non-compliant coolers imediately.

DISCREPANCIES				
LSID	LSCID	Sample Label ID/COC ID	Discrepancy Code	Corrective Action Code
<u>-01</u>		<u>1050</u>	<u>D3</u>	

REVIEWS

Sample Labeling <u>[Signature]</u>	SRF <u>[Signature]</u>	PM <u>[Signature]</u>
Date <u>12/16/09</u>	Date <u>12/16/09</u>	Date <u>12/17/09</u>

- LEGEND:
- | | | |
|---|--|--|
| <p>Code Description-Sample Management</p> <ul style="list-style-type: none"> A1 Analysis is not indicated in COC A2 Analysis is not indicated in label A3 Analysis is inconsistent in COC vis-à-vis label A4 _____ B1 Sample ID is not indicated in COC B2 Sample ID is not indicated in label B3 Sample ID is inconsistent in COC vis-à-vis label B4 _____ C1 Wrong container C2 Broken container C3 Leaking container C4 _____ | <p>Code Description-Sample Management</p> <ul style="list-style-type: none"> D1 Date and/or time is not indicated in COC D2 Date and/or time is not indicated in label D3 Date and/or time is inconsistent in COC vis-à-vis label E1 Insufficient preservative E2 Improper preservation F1 Insufficient Sample F2 Bubble is > 6mm G1 Temperature is out of range G2 Out of Holding Time G3 >20 % solid particle H1 _____ H2 _____ | <p>Code Description-Project Management</p> <ul style="list-style-type: none"> R1 Hold sample(s); wait for further instructions R2 Proceed as indicated in COC R3 Refer to attached instruction R4 Cancel the analysis R5 _____ R6 _____ |
|---|--|--|

REPORTING CONVENTIONS

DATA QUALIFIERS:

Lab Qualifier	AFCEE Qualifier	Description
J	F	Indicates that the analyte is positively identified and the result is less than RL but greater than MDL.
N		Indicates presumptive evidence of a compound.
B	B	Indicates that the analyte is found in the associated method blank as well as in the sample at above QC level.
E	J	Indicates that the result is above the maximum calibration range.
*	*	Out of QC limit.

Note: The above qualifiers are used to flag the results unless the project requires a different set of qualification criteria.

ACRONYMS AND ABBREVIATIONS:

CRDL	Contract Required Detection Limit
RL	Reporting Limit
MRL	Method Reporting Limit
PQL	Practical Quantitation Limit
MDL	Method Detection Limit
DO	Diluted out

DATES

The date and time information for leaching and preparation reflect the beginning date and time of the procedure unless the method, protocol, or project specifically requires otherwise.

LABORATORY REPORT FOR

MWH LABORATORIES

321481

METHOD 3520C/8081A
PESTICIDES

SDG#: 09L284

36/46

CASE NARRATIVE

Client : MWH LABORATORIES
Project : 321481
SDG : 09L284

METHOD 3520C/8081A
PESTICIDES

A total of four (4) water samples were received on 12/16/09 for Pesticides Organochlorine analysis, Method 3520C/8081A in accordance with USEPA SW-846, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods.

Holding Time

Samples were analyzed within the prescribed holding time.

Instrument Performance and Calibration

Instrument performance was checked prior to calibration. DDT and Endrin breakdown were within specification. Multi-calibration points were generated to establish initial calibration (ICAL). ICAL was verified using secondary source (ICV). Continuing calibration (CCV) was carried on at a frequency required by the project. All project calibration requirements were satisfied. Refer to calibration summary forms for ICAL, ICV and CCV for details.

Method Blank

Method blank was analyzed at the frequency required by the project. For this SDG, one method blank was analyzed with the samples. Result was compliant to project requirement.

Lab Control Sample

A set of LCS/LCD was analyzed with the samples in this SDG. Percent recoveries for CPL032WL/C were all within QC limits.

Matrix QC Sample

No matrix QC sample was designated in this SDG.

Surrogate

Surrogates were added on QC and field samples. Surrogate recoveries were within project QC limits.

Sample Analysis

Samples were analyzed according to prescribed analytical procedures. All project requirements were met otherwise anomalies were discussed within the associated QC parameter. Positive sample results were confirmed by a second column. Relative percentage difference (RPD) between the two results were evaluated. If RPD is less than 40% and peaks are well defined the higher result is reported. Where RPD is greater than 40% the chromatogram is checked for anomalies and results are selected based on processed knowledge. If there is no evidence of any chromatographic ambiguity, the higher result is reported.

LAB CHRONICLE
PESTICIDES

Client : MWH LABORATORIES SDG NO. : 09L284
 Project : 321481 Instrument ID : GCT008

Client Sample ID	Laboratory Sample ID	Dilution Factor	% Moist	Analysis DateTime	Extraction DateTime	Sample Data FN	Calibration Data FN	Prep. Batch	Notes

FM - Filename
 % Moist - Percent Moisture

SAMPLE RESULTS

METHOD 3520C/8081A
PESTICIDES

```

=====
Client      : MWH LABORATORIES           Date Collected: 12/15/09
Project     : 321481                     Date Received: 12/16/09
Batch No.   : 09L284                     Date Extracted: 12/22/09 14:00
Sample ID   : 200912150269              Date Analyzed: 12/23/09 20:30
Lab Samp ID : L284-01                    Dilution Factor: 0.95
Lab File ID : SL23011A                   Matrix          : WATER
Ext Btch ID : CPL032W                    % Moisture      : NA
Calib. Ref.: SL23003A                    Instrument ID   : GCT008
=====

```

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ALPHA-BHC	(ND) ND	0.095	0.019 0.019
GAMMA-BHC (LINDANE)	(ND) ND	0.095	0.019 0.019
BETA-BHC	(ND) ND	0.095	0.019 0.019
HEPTACHLOR	(ND) ND	0.095	0.019 0.019
DELTA-BHC	(ND) ND	0.095	0.019 0.019
ALDRIN	(ND) ND	0.095	0.019 0.019
HEPTACHLOR EPOXIDE	(ND) ND	0.095	0.019 0.019
GAMMA-CHLORDANE	(ND) ND	0.095	0.019 0.019
ALPHA-CHLORDANE	(ND) ND	0.095	0.019 0.019
ENDOSULFAN I	(ND) ND	0.095	0.019 0.019
4,4'-DDE	(ND) ND	0.19	0.019 0.019
DIELDRIN	(ND) ND	0.19	0.019 0.019
ENDRIN	(ND) ND	0.19	0.019 0.019
4,4'-DDD	(ND) ND	0.19	0.019 0.019
ENDOSULFAN II	(ND) ND	0.19	0.019 0.019
4,4'-DDT	(ND) ND	0.19	0.019 0.019
ENDRIN ALDEHYDE	(ND) ND	0.19	0.019 0.019
ENDOSULFAN SULFATE	(ND) ND	0.19	0.019 0.019
ENDRIN KETONE	(ND) ND	0.19	0.019 0.019
METHOXYCHLOR	(ND) ND	0.95	0.19 0.19
TOXAPHENE	(ND) ND	1.9	0.95 0.95

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TETRACHLORO-M-XYLENE	(84) 82	30-140
DECACHLOROBIPHENYL	(90) 82	40-150

RL : Reporting limit
Left of | is related to first column ; Right of | related to second column
Final result indicated by ()

METHOD 3520C/8081A
PESTICIDES

```

=====
Client      : MWH LABORATORIES           Date Collected: 12/15/09
Project     : 321481                     Date Received: 12/16/09
Batch No.   : 09L284                     Date Extracted: 12/22/09 14:00
Sample ID   : 200912150270              Date Analyzed: 12/23/09 20:54
Lab Samp ID : L284-02                     Dilution Factor: 0.95
Lab File ID : SL23012A                   Matrix          : WATER
Ext Btch ID : CPL032W                     % Moisture     : NA
Calib. Ref.: SL23003A                     Instrument ID   : GCT008
=====

```

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ALPHA-BHC	(ND) ND	0.095	0.019 0.019
GAMMA-BHC (LINDANE)	(ND) 0.041J	0.095	0.019 0.019
BETA-BHC	0.044J (ND)	0.095	0.019 0.019
HEPTACHLOR	(ND) ND	0.095	0.019 0.019
DELTA-BHC	(ND) 0.044J	0.095	0.019 0.019
ALDRIN	0.034J (ND)	0.095	0.019 0.019
HEPTACHLOR EPOXIDE	(ND) ND	0.095	0.019 0.019
GAMMA-CHLORDANE	(ND) ND	0.095	0.019 0.019
ALPHA-CHLORDANE	0.026J (ND)	0.095	0.019 0.019
ENDOSULFAN I	(ND) ND	0.095	0.019 0.019
4,4'-DDE	(ND) ND	0.19	0.019 0.019
DIELDRIN	(ND) ND	0.19	0.019 0.019
ENDRIN	(ND) ND	0.19	0.019 0.019
4,4'-DDD	(ND) ND	0.19	0.019 0.019
ENDOSULFAN II	(ND) ND	0.19	0.019 0.019
4,4'-DDT	(ND) ND	0.19	0.019 0.019
ENDRIN ALDEHYDE	0.047J (ND)	0.19	0.019 0.019
ENDOSULFAN SULFATE	(ND) 0.040J	0.19	0.019 0.019
ENDRIN KETONE	(ND) ND	0.19	0.019 0.019
METHOXYCHLOR	(ND) ND	0.95	0.19 0.19
TOXAPHENE	(ND) ND	1.9	0.95 0.95

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TETRACHLORO-M-XYLENE	(75) 83	30-140
DECACHLOROBIPHENYL	(79) 79	40-150

RL : Reporting limit
Left of | is related to first column ; Right of | related to second column
Final result indicated by ()

METHOD 3520C/8081A
PESTICIDES

```

=====
Client      : MWH LABORATORIES           Date Collected: 12/15/09
Project     : 321481                     Date Received: 12/16/09
Batch No.   : 09L284                     Date Extracted: 12/22/09 14:00
Sample ID   : 200912150271              Date Analyzed: 12/23/09 21:17
Lab Samp ID : L284-03                    Dilution Factor: 0.95
Lab File ID : SL23013A                   Matrix          : WATER
Ext Btch ID : CPL032W                    % Moisture     : NA
Calib. Ref.: SL23003A                    Instrument ID   : GCT008
=====

```

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ALPHA-BHC	(ND) ND	0.095	0.019 0.019
GAMMA-BHC (LINDANE)	(ND) ND	0.095	0.019 0.019
BETA-BHC	(ND) ND	0.095	0.019 0.019
HEPTACHLOR	(ND) ND	0.095	0.019 0.019
DELTA-BHC	(ND) ND	0.095	0.019 0.019
ALDRIN	(ND) ND	0.095	0.019 0.019
HEPTACHLOR EPOXIDE	(ND) ND	0.095	0.019 0.019
GAMMA-CHLORDANE	(ND) ND	0.095	0.019 0.019
ALPHA-CHLORDANE	(ND) ND	0.095	0.019 0.019
ENDOSULFAN I	(ND) ND	0.095	0.019 0.019
4,4'-DDE	(ND) ND	0.19	0.019 0.019
DIELDRIN	(ND) ND	0.19	0.019 0.019
ENDRIN	(ND) ND	0.19	0.019 0.019
4,4'-DDD	(ND) ND	0.19	0.019 0.019
ENDOSULFAN II	(ND) ND	0.19	0.019 0.019
4,4'-DDT	(ND) ND	0.19	0.019 0.019
ENDRIN ALDEHYDE	(ND) ND	0.19	0.019 0.019
ENDOSULFAN SULFATE	(ND) ND	0.19	0.019 0.019
ENDRIN KETONE	(ND) ND	0.19	0.019 0.019
METHOXYCHLOR	(ND) ND	0.95	0.19 0.19
TOXAPHENE	(ND) ND	1.9	0.95 0.95

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TETRACHLORO-M-XYLENE	(92) 89	30-140
DECACHLOROBIPHENYL	(91) 84	40-150

RL : Reporting limit
Left of | is related to first column ; Right of | related to second column
Final result indicated by ()

METHOD 3520C/8081A
PESTICIDES

```

=====
Client      : MWH LABORATORIES           Date Collected: 12/15/09
Project    : 321481                     Date Received: 12/16/09
Batch No.  : 09L284                     Date Extracted: 12/22/09 14:00
Sample ID  : 200912150272              Date Analyzed: 12/23/09 21:41
Lab Samp ID: L284-04                   Dilution Factor: 0.96
Lab File ID: SL23014A                  Matrix          : WATER
Ext Btch ID: CPL032W                   % Moisture      : NA
Calib. Ref.: SL23003A                  Instrument ID   : GCT008
=====

```

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ALPHA-BHC	(ND) ND	0.096	0.019 0.019
GAMMA-BHC (LINDANE)	(ND) ND	0.096	0.019 0.019
BETA-BHC	(ND) ND	0.096	0.019 0.019
HEPTACHLOR	(ND) ND	0.096	0.019 0.019
DELTA-BHC	(ND) ND	0.096	0.019 0.019
ALDRIN	(ND) ND	0.096	0.019 0.019
HEPTACHLOR EPOXIDE	(ND) ND	0.096	0.019 0.019
GAMMA-CHLORDANE	(ND) ND	0.096	0.019 0.019
ALPHA-CHLORDANE	(ND) ND	0.096	0.019 0.019
ENDOSULFAN I	(ND) ND	0.096	0.019 0.019
4,4'-DDE	(ND) ND	0.19	0.019 0.019
DIELDRIN	(ND) ND	0.19	0.019 0.019
ENDRIN	(ND) ND	0.19	0.019 0.019
4,4'-DDD	(ND) ND	0.19	0.019 0.019
ENDOSULFAN II	(ND) ND	0.19	0.019 0.019
4,4'-DDT	(ND) ND	0.19	0.019 0.019
ENDRIN ALDEHYDE	(ND) ND	0.19	0.019 0.019
ENDOSULFAN SULFATE	(ND) ND	0.19	0.019 0.019
ENDRIN KETONE	(ND) ND	0.19	0.019 0.019
METHOXYCHLOR	(ND) ND	0.96	0.19 0.19
TOXAPHENE	(ND) ND	1.9	0.96 0.96

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TETRACHLORO-M-XYLENE	(88) 88	30-140
DECACHLOROBIPHENYL	(91) 85	40-150

RL : Reporting limit
Left of | is related to first column ; Right of | related to second column
Final result indicated by ()

QC SUMMARIES

METHOD 3520C/8081A
PESTICIDES

```

=====
Client      : MWH LABORATORIES           Date Collected: NA
Project     : 321481                    Date Received: 12/22/09
Batch No.   : 09L284                    Date Extracted: 12/22/09 14:00
Sample ID   : MBLK1W                    Date Analyzed: 12/23/09 18:33
Lab Samp ID: CPL032WB                   Dilution Factor: 1
Lab File ID: SL23006A                   Matrix          : WATER
Ext Btch ID: CPL032W                     % Moisture     : NA
Calib. Ref.: SL23003A                   Instrument ID   : GCT008
=====
  
```

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ALPHA-BHC	(ND) ND	0.10	0.020 0.020
GAMMA-BHC (LINDANE)	(ND) ND	0.10	0.020 0.020
BETA-BHC	(ND) ND	0.10	0.020 0.020
HEPTACHLOR	(ND) ND	0.10	0.020 0.020
DELTA-BHC	(ND) ND	0.10	0.020 0.020
ALDRIN	(ND) ND	0.10	0.020 0.020
HEPTACHLOR EPOXIDE	(ND) ND	0.10	0.020 0.020
GAMMA-CHLORDANE	(ND) ND	0.10	0.020 0.020
ALPHA-CHLORDANE	(ND) ND	0.10	0.020 0.020
ENDOSULFAN I	(ND) ND	0.10	0.020 0.020
4,4'-DDE	(ND) ND	0.20	0.020 0.020
DIELDRIN	(ND) ND	0.20	0.020 0.020
ENDRIN	(ND) ND	0.20	0.020 0.020
4,4'-DDD	(ND) ND	0.20	0.020 0.020
ENDOSULFAN II	(ND) ND	0.20	0.020 0.020
4,4'-DDT	(ND) ND	0.20	0.020 0.020
ENDRIN ALDEHYDE	(ND) ND	0.20	0.020 0.020
ENDOSULFAN SULFATE	(ND) ND	0.20	0.020 0.020
ENDRIN KETONE	(ND) ND	0.20	0.020 0.020
METHOXYCHLOR	(ND) ND	1.0	0.20 0.20
TOXAPHENE	(ND) ND	2.0	1.0 1.0

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TETRACHLORO-M-XYLENE	(89) 87	30-130
DECACHLOROBIPHENYL	(93) 87	40-150

RL : Reporting limit
 Left of | is related to first column ; Right of | related to second column
 Final result indicated by ()

EMAX QUALITY CONTROL DATA
LCS/LCD ANALYSIS

CLIENT: MWH LABORATORIES
PROJECT: 321481
BATCH NO.: 09L284
METHOD: METHOD 3520C/8081A

MATRIX: WATER
DILUTION FACTOR: 1 1
SAMPLE ID: MBLK1W
LAB SAMP ID: CPL032WB CPL032WC
LAB FILE ID: SL23006A SL23007A SL23008A
DATE EXTRACTED: 12/22/0914:00 12/22/0914:00 12/22/0914:00
DATE ANALYZED: 12/23/0918:33 12/23/0918:57 12/23/0919:20
PREP. BATCH: CPL032W
CALIB. REF: SL23003A SL23003A SL23003A

DATE COLLECTED: NA
DATE RECEIVED: 12/22/09

% MOISTURE: NA

ACCESSION:

PARAMETER	BLNK RSLT (ug/L)	SPIKE AMT (ug/L)	BS RSLT (ug/L)	BS % REC	SPIKE AMT (ug/L)	BSD RSLT (ug/L)	BSD % REC	RPD (%)	QC LIMIT (%)	MAX RPD (%)
gamma-BHC (Lindane)	(ND) ND	0.400	(0.449) 0.425	(112) 106	0.400	(0.471) 0.444	(118) 111	(5) 4	40-130	30
Heptachlor	(ND) ND	0.400	(0.504) 0.484	(126) 121	0.400	(0.511) 0.485	(128) 121	(1) 0	30-140	30
Aldrin	(ND) ND	0.400	(0.442) 0.432	(110) 108	0.400	(0.453) 0.438	(113) 110	(2) 1	40-130	30
Dieldrin	(ND) ND	0.400	(0.465) 0.456	(116) 114	0.400	(0.474) 0.461	(118) 115	(2) 1	60-140	30
Endrin	(ND) ND	0.400	(0.447) 0.430	(112) 108	0.400	(0.430) 0.410	(108) 102	(4) 5	50-140	30
4,4'-DDT	(ND) ND	0.400	(0.539) 0.480	(135) 120	0.400	(0.550) 0.477	(138) 119	(2) 1	60-140	30

SURROGATE PARAMETER	SPIKE AMT (ug/L)	BS RSLT (ug/L)	BS % REC	SPIKE AMT (ug/L)	BSD RSLT (ug/L)	BSD % REC	QC LIMIT (%)
Tetrachloro-m-xylene	0.400	(0.366) 0.360	(91) 90	0.400	(0.371) 0.358	(93) 89	30-130
Decachlorobiphenyl	0.400	(0.373) 0.348	(93) 87	0.400	(0.380) 0.354	(95) 88	40-150