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Watson Cogeneration Company
22850 South Wilmington Avenue
Carson, CA 90740-6203

Darrin Fost
Business Manager
310.816.8812

March 31, 2021

Mr. Anwar Ali
Compliance Project Manager
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814

Subject: **2020 Annual Compliance Report**
Watson Cogeneration Project (85-AFC-01C)

Dear Mr. Ali,

Attached is the Annual Compliance Report for 2020 pursuant to the requirements of the California Energy Commission's Conditions of Certification for the Watson Cogeneration Company.

If you have any questions regarding this report, please contact me via telephone at (310) 816-8812 or via e-mail at DFost@Marathonpetroleum.com.

Sincerely,

Darrin Fost

Darrin Fost
Business Manager
Watson Cogeneration Company

AIR QUALITY CONDITIONS OF CERTIFICATION

AQ-25 A continuous monitoring system must be installed and operated to monitor and record the fuel consumption and the mass ratio of steam-to-fuel for each fuel being fired in each gas Turbines 1, 2, 3, 4 and 5. This system must be accurate to within +5.0 percent and calibrated once every 12 months.

Verification: The owner/operator shall maintain records of continuous fuel consumption and the steam-to-fuel mass ratio monitoring. These records will be maintained on file for at least two years and shall be made available to the SCAQMD and CEC staff upon request. CEM Relative Accuracy Test report will be submitted to the CEC annually.

Response: Instrumentation is in place for the purpose of continuous monitoring and recording of fuel consumption and steam injection to each of the four gas turbines at the facility (#5 was never constructed). The systems undergo regular calibration. A summary of fuel consumption and steam injection to each of the turbines is included below.

AQ-25	Unit 91					Unit 92				
	NG/RFG	Butane	Total Fuel	DeNOx Steam	Steam : Fuel	NG/RFG	Butane	Total Fuel	DeNOx Steam	Steam : Fuel
	lb/sec	lb/sec	lb/sec	lb/sec	Ratio	lb/sec	lb/sec	lb/sec	lb/sec	Ratio
Jan-20	11.503	0.324	11.827	14.200	1.201	10.393	0.696	11.089	12.805	1.100
Feb-20	7.943	0.235	8.178	9.995	2.182	11.433	0.696	12.129	14.300	1.179
Mar-20	11.516	0.371	11.887	14.288	1.202	11.582	0.696	12.278	14.521	1.182
Apr-20	11.454	0.447	11.901	14.278	1.200	11.548	0.696	12.244	14.560	1.189
May-20	6.359	0.242	6.602	8.212	2.070	11.524	0.696	12.220	14.585	1.193
Jun-20	11.408	0.365	11.773	14.316	1.216	11.473	0.696	12.169	14.508	1.192
Jul-20	9.083	0.185	9.268	11.632	1.925	11.628	0.696	12.324	14.856	1.205
Aug-20	11.453	0.294	11.747	14.511	1.235	11.482	0.696	12.178	14.654	1.203
Sep-20	11.331	0.323	11.654	14.202	1.219	11.400	0.696	12.096	14.423	1.192
Oct-20	3.962	0.229	4.192	5.348	3.924	11.394	0.696	12.090	14.372	1.189
Nov-20	10.799	0.080	10.879	13.384	1.234	11.479	0.696	12.174	14.310	1.175
Dec-20	11.329	0.095	11.424	13.928	1.219	11.382	0.696	12.078	14.075	1.165
	Unit 93					Unit 94				
	NG/RFG	Butane	Total Fuel	DeNOx Steam	Steam : Fuel	NG/RFG	Butane	Total Fuel	DeNOx Steam	Steam : Fuel
	lb/sec	lb/sec	lb/sec	lb/sec	Ratio	lb/sec	lb/sec	lb/sec	lb/sec	Ratio
Jan-20	11.209	0.508	11.717	13.585	1.159	11.453	0.192	11.645	14.076	1.209
Feb-20	5.849	0.330	6.179	7.118	1.642	11.231	0.402	11.633	13.817	1.188
Mar-20	11.221	0.360	11.581	13.726	1.185	11.368	0.214	11.582	13.989	1.208
Apr-20	11.117	0.416	11.532	13.622	1.181	11.318	0.190	11.508	13.984	1.215
May-20	10.102	0.527	10.629	12.540	1.390	11.319	0.324	11.643	14.062	1.208
Jun-20	11.268	0.517	11.785	13.971	1.185	11.239	0.205	11.444	13.960	1.220
Jul-20	11.425	0.551	11.976	14.343	1.198	11.376	0.174	11.550	14.276	1.236
Aug-20	11.261	0.541	11.801	14.090	1.194	11.255	0.244	11.499	14.095	1.226
Sep-20	11.047	0.461	11.508	13.643	1.186	11.096	0.232	11.328	13.728	1.212
Oct-20	10.971	0.543	11.514	13.413	1.165	11.093	0.329	11.422	13.682	1.198
Nov-20	10.668	0.425	11.093	12.787	1.153	11.295	0.172	11.466	14.015	1.222
Dec-20	10.497	0.456	10.953	12.355	1.128	11.245	0.165	11.410	13.971	1.224

AQ-42 No more than one of the cogeneration units 1, 2, 3, 4 or 5 shall startup or shutdown in any one day. For Turbine Trains 1, 2, 3 and 4, start up shall not exceed 8 hours and shutdown shall not exceed 4 hours. For Turbine Train 5, neither start up nor

shutdown shall exceed 4 hours in duration.

Verification: The owner/operator shall maintain an operation log for the facility which, at a minimum, will identify startup and shutdown occurrences for each cogeneration unit. The owner/operator shall submit in its Annual Compliance Report to the CEC a summary of the operational log demonstrating compliance with this condition 5. (97-0924-4; 88-0525-18b)

Response: In the 2020 calendar year, APPC/Watson had 10 startups and 10 shutdowns. No startups exceeded an 8 hour duration and no shutdowns exceeded a 4 hour duration. Startup and shutdown dates shown in the tables below.

AQ-42: Shutdown Summary - 2020		
Unit	**Date**	**Duration < 4 Hours**
91	1/31/2020	Yes
91	5/3/2020	Yes
91	5/13/2020	Yes
91	7/24/2020	Yes
91	10/9/2020	Yes
91	11/6/2020	Yes
91	11/13/2020	Yes
92	1/24/2020	Yes
93	2/15/2020	Yes
93	5/11/2020	Yes

AQ-42: Startup Summary - 2020		
Unit	**Date**	**Duration < 8 Hours**
91	2/9/2020	Yes
91	5/9/2020	Yes
91	5/21/2020	Yes
91	7/31/2020	Yes
91	10/29/2020	Yes
91	11/7/2020	Yes
91	11/13/2020	Yes
92	1/27/2020	Yes
93	2/28/2020	Yes
93	5/14/2020	Yes

AQ-43 The duct burner of the cogeneration units 1, 2, 3, 4 and 5 shall not be fired during the startup mode of operation.

Verification: The owner/operator shall maintain an operation log for the facility which, at minimum will identify the hours of operation of the duct burners. The owner/operator shall submit in its Annual Compliance Report to the CEC a summary of the operational log

demonstrating compliance with this condition.

Response: During the 2020 calendar year, APPC/Watson had 10 startups. Duct burners were not fired during the startup mode of operation for any of the 10 startup events. Startup dates shown in the table below.

AQ-43: Startup Summary - 2020		
Unit	**Date**	**Duct Fuel After Startup**
91	2/9/2020	Yes
91	5/9/2020	Yes
91	5/21/2020	Yes
91	7/31/2020	Yes
91	10/29/2020	Yes
91	11/7/2020	Yes
91	11/13/2020	Yes
92	1/27/2020	Yes
93	2/28/2020	Yes
93	5/14/2020	Yes

BIOLOGICAL RESOURCES CONDITIONS OF CERTIFICATION

BIO-3 APPC shall monitor daily the zinc content, total volume and duration of all discharges from the ARC0 Watson Refinery into the Dominguez Channel, which contain commingled cogeneration project cooling tower blowdown. The initial period of monitoring shall cover the first three years during which water is discharged into the Dominguez Channel. The need for subsequent monitoring will be determined by the CEC based on an evaluation of the zinc content of samples collected during the first three years of discharge. APPC shall take remedial action if monitored zinc levels exceed the EPA standard for salt water aquatic life.

Verification: APPC shall notify the CEC within 30 days of any discharge which exceeds EPA levels for zinc describing the cause of the exceedance and action taken to prevent similar occurrences. APPC shall submit written reports for the first three years during which APPC discharges to Dominguez Channel. The report shall contain the date, time, volume, duration and zinc content of the discharge. These reports can be appended to the annual compliance report for the years during which discharges to Dominguez Channel occurred. The reports shall be Submitted to the CEC and the Port of Los Angeles.

Response: APPC/Watson does not have its own NPDES permit. Low Volume Waste (LVW; boiler blowdown) from the Cogen are authorized to be discharged to the Dominguez Channel under the Tesoro Los Angeles Refinery – Carson Operations NPDES permit (Order No. R4-2015-0295, NPDES No. CA0000680). Zinc is listed in the permit with an effluent limitation; therefore, a discharge would be analyzed for zinc. A copy of the annual NPDES report has been included

at the end of this annual compliance report.

COGENERATION CONDITIONS OF CERTIFICATION

COG-1 ARCO Petroleum Products Company (APPC) shall operate the facility as a cogeneration system in accordance with the definition of cogeneration contained in PRC Section 25134(a) and (b) and Title 18 CFR, Section 292.205(a)(1) and (a)(2)(i)(B).

Verification: APPC shall file with the CEC during each calendar year an annual report in which monthly average values of the following plant operating parameters will be given:

a. Gas turbine, MW (gross) at the generator terminals for each unit
b. Gas turbine operating hours for each unit
c. For each CTG and each HRSG duct burner provide fuel input including:
    - type, natural gas, refinery gas or butane
    - rate, lb/hr
    - heating value (low), Btu/lb
    - firing hours
d. Inlet air flow, lb/hr
e. Combustion turbine exhaust gas temperature, Deg F
f. NOx steam injection rate, lb/hr
g. Stack exiting flue gas temperature, Deg F
h. Steam turbine, MW (gross)
i. Steam turbine operating hours
j. Plant auxiliary load, MW (total)
k. For the process steam:
    - process steam demand, lb/hr
    - demand hours
    - process steam temperature (Deg F), quality (%), pressure (PSIA)and enthalpy (Btu/lb) at plant boundary
l. Feedwater rate (lb/hr), temperature (Deg F)
m. Condensate return rate (lb/hr), temperature (Deg F)
n. Process steam from auxiliary boilers, lb/hr; auxiliary boiler's operating hours

Or APPC may, with CEC concurrence, submit the following operating parameters:

o. Monthly fuel use (includes quantity and Btu value) as evidenced by an invoice from the gas supplier
p. Monthly electrical sales (includes kWh) as evidenced by an invoice to Southern California Edison Company
q. Monthly steam sales (includes quantity and Btu value) as evidenced by an invoice (or equivalent) to APPC
r. If the rate of items o, p, or q above differs by more than +5, +15, and +10 percent, respectively, from rated conditions, APPC shall provide, at the specific written request of the CEC Staff, an explanation of such anomaly
s. Feedwater rate (lb/hr) and temperature (Deg F)
t. Condensate return rate (lbs/hr) and temperature (Deg F)
u. Process steam from auxiliary boilers, lb/hr; auxiliary boiler's operating hours.

Not less than thirty (30) days prior to the scheduled date for the CEC Decision on the AFC, APPC shall notify the CEC of APPC's preference for either conditions a-n, or o-u.

This report shall also provide information for each month on any partial or total power and/or process steam production curtailment, including duration of curtailment and reasons for

curtailment. The report shall be certified by the plant manager.

Response: Monthly average values of the above listed plant operating parameters are included in the tables below. Please note that parameter n. (auxiliary boilers) is not applicable, as there are no auxiliary boilers at this location.

COG-1 (a-n)	Unit 91													
Subsection:	a	b	c								d	e	f	g
			GTG					HRSG			Inlet	GTG	DeNOx	Stack
			NG/RFG	Butane	Total	HHV	Firing	NG/RFG	HHV	Firing	Air Flow	Exhaust	Steam	Exhaust
	MW	Op Hours	lb/hr	lb/hr	lb/hr	BTU/lb	Hours	lb/hr	BTU/lb	Hours	lb/hr	deg F	lb/sec	deg F
Jan-20	86.6	744	41412	1167	42579	20391	744	68.8	20391	744	2293699	1004	14.2	340
Feb-20	59.1	489	28595	848	29442	20656	489	104.6	20656	638	2293699	714	10.0	262
Mar-20	86.5	743	41458	1336	42794	20488	743	83.9	20488	743	2293699	1012	14.3	340
Apr-20	85.3	720	41234	1609	42843	20171	720	77.5	20171	719	2293699	1014	14.3	341
May-20	45.8	413	22894	873	23767	20389	413	68.3	20389	410	2293699	606	8.2	245
Jun-20	84.5	720	41067	1314	42381	20345	720	90.5	20345	720	2293699	1018	14.3	337
Jul-20	67.1	587	32697	668	33365	20524	587	84.4	20524	586	2293699	823	11.6	832
Aug-20	83.2	744	41232	1059	42291	19972	744	88.3	19972	744	2293699	1023	14.5	337
Sep-20	83.7	720	40793	1162	41955	20338	720	82.2	20338	720	2293699	1022	14.2	338
Oct-20	27.6	266	14264	826	15090	20230	266	27.0	20230	266	2293699	420	5.3	190
Nov-20	80.4	693	38876	288	39165	20187	693	60.7	20187	691	2293699	970	13.4	329
Dec-20	84.8	743	40785	342	41128	19696	743	86.6	19696	743	2293699	1007	13.9	331
COG-1 (a-n)	Unit 92													
Subsection:	a	b	c								d	e	f	g
			GTG					HRSG			Inlet	GTG	DeNOx	Stack
			NG/RFG	Butane	Total	HHV	Firing	NG/RFG	HHV	Firing	Air Flow	Exhaust	Steam	Exhaust
	MW	Op Hours	lb/hr	lb/hr	lb/hr	BTU/lb	Hours	lb/hr	BTU/lb	Hours	lb/hr	deg F	lb/sec	deg F
Jan-20	79.0	683	37416	2505	39922	20391	683	64.6	20391	745	2293699	928	12.8	326
Feb-20	87.8	696	41157	2505	43663	20656	696	160.3	20656	696	2293699	1030	14.3	336
Mar-20	88.4	743	41697	2505	44202	20488	743	89.0	20488	743	2293699	1017	14.5	337
Apr-20	87.4	720	41573	2505	44079	20171	720	74.1	20171	719	2293699	1019	14.6	337
May-20	86.3	744	41488	2505	43993	20389	744	151.9	20389	744	2293699	1023	14.6	333
Jun-20	86.0	720	41303	2505	43808	20345	720	86.2	20345	720	2293699	1024	14.5	336
Jul-20	85.7	744	41862	2505	44367	20524	744	127.9	20524	743	2293699	1026	14.9	335
Aug-20	84.7	744	41336	2505	43841	19972	744	86.2	19972	744	2293699	1028	14.7	336
Sep-20	85.6	720	41041	2505	43547	20338	720	77.6	20338	720	2293699	1027	14.4	337
Oct-20	85.0	744	41020	2505	43525	20230	744	129.1	20230	744	2293699	1027	14.4	336
Nov-20	87.5	720	41323	2505	43828	20187	720	67.5	20187	720	2293699	1020	14.3	341
Dec-20	86.7	743	40975	2505	43480	19696	743	86.0	19696	743	2293699	1011	14.1	340
COG-1 (a-n)	Unit 93													
Subsection:	a	b	c								d	e	f	g
			GTG					HRSG			Inlet	GTG	DeNOx	Stack
			NG/RFG	Butane	Total	HHV	Firing	NG/RFG	HHV	Firing	Air Flow	Exhaust	Steam	Exhaust
	MW	Op Hours	lb/hr	lb/hr	lb/hr	BTU/lb	Hours	lb/hr	BTU/lb	Hours	lb/hr	deg F	lb/sec	deg F
Jan-20	81.7	745	40353	1828	42181	20391	745	84.9	20391	745	2293699	1015	13.6	348
Feb-20	41.1	363	21057	1189	22245	20656	363	82.5	20656	542	2293699	569	7.1	220
Mar-20	82.3	743	40397	1296	41693	20488	743	81.8	20488	743	2293699	1024	13.7	340
Apr-20	80.7	720	40020	1497	41516	20171	720	69.8	20171	719	2293699	1028	13.6	341
May-20	72.5	671	36366	1898	38264	20389	671	131.5	20389	660	2293699	936	12.5	321
Jun-20	81.6	720	40565	1860	42425	20345	720	86.5	20345	720	2293699	1028	14.0	340
Jul-20	81.5	744	41130	1985	43115	20524	744	128.0	20524	744	2293699	1029	14.3	339
Aug-20	80.0	744	40538	1947	42485	19972	744	86.1	19972	744	2293699	1032	14.1	340
Sep-20	79.7	720	39769	1659	41428	20338	720	77.6	20338	720	2293699	1031	13.6	340
Oct-20	78.6	744	39495	1954	41450	20230	744	128.7	20230	744	2293699	1025	13.4	339
Nov-20	77.6	720	38403	1530	39933	20187	720	68.7	20187	720	2293699	1001	12.8	342
Dec-20	76.2	743	37788	1643	39430	19696	743	86.1	19696	743	2293699	973	12.4	343
COG-1 (a-n)	Unit 94													
Subsection:	a	b	c								d	e	f	g
			GTG					HRSG			Inlet	GTG	DeNOx	Stack
			NG/RFG	Butane	Total	HHV	Firing	NG/RFG	HHV	Firing	Air Flow	Exhaust	Steam	Exhaust
	MW	Op Hours	lb/hr	lb/hr	lb/hr	BTU/lb	Hours	lb/hr	BTU/lb	Hours	lb/hr	deg F	lb/sec	deg F
Jan-20	86.2	745	41230	693	41922	20391	745	73.6	20391	745	2293699	1020	14.1	352
Feb-20	84.7	696	40433	1446	41880	20656	696	155.9	20656	696	2293699	1026	13.8	348
Mar-20	85.2	743	40926	769	41695	20488	743	83.1	20488	743	2293699	1023	14.0	348
Apr-20	84.2	720	40744	685	41429	20171	720	70.9	20171	720	2293699	1026	14.0	348
May-20	83.4	744	40749	1167	41916	20389	744	155.7	20389	743	2293699	1028	14.1	345
Jun-20	82.8	720	40460	737	41197	20345	720	85.5	20345	720	2293699	1029	14.0	347
Jul-20	82.5	744	40954	627	41581	20524	744	127.1	20524	744	2293699	1030	14.3	346
Aug-20	81.5	744	40519	877	41396	19972	744	84.2	19972	744	2293699	1033	14.1	348
Sep-20	81.7	720	39945	835	40780	20338	720	74.6	20338	720	2293699	1032	13.7	348
Oct-20	81.3	744	39933	1184	41118	20230	744	126.5	20230	744	2293699	1032	13.7	347
Nov-20	84.4	720	40661	618	41279	20187	720	67.1	20187	720	2293699	1025	14.0	350
Dec-20	84.1	743	40483	593	41076	19696	743	86.0	19696	743	2293699	1048	14.0	350

COG-1 (a-n)	STG 1		STG 2		Plant Load	600# Steam				150# Steam			
Subsection:	h	i	h	i	j	k				k			
	MW	Hours	MW	Hours	MW	mlb/hr	Hours	PSIG	deg F	mlb/hr	Hours	PSIG	deg F
Jan-20	19	745	0	0	80	1020	744	622	750	12	744	162	498
Feb-20	19	694	0	0	82	1029	696	622	751	10	696	162	498
Mar-20	17	741	0	0	70	1109	744	622	749	18	744	161	506
Apr-20	13	592	4	155	64	1085	720	621	750	22	720	161	514
May-20	16	682	1	38	73	1133	744	621	750	8	744	154	391
Jun-20	3	141	17	718	83	1110	720	622	750	0	720	152	363
Jul-20	5	94	17	742	74	1073	744	622	750	2	744	152	364
Aug-20	2	41	18	744	74	1100	744	622	750	3	744	152	361
Sep-20	9	345	14	521	88	1040	720	621	750	4	720	152	360
Oct-20	9	444	9	326	89	1010	744	620	750	0	744	153	360
Nov-20	16	714	0	0	84	1069	720	620	750	0	720	152	358
Dec-20	15	721	0	0	77	1144	744	620	750	0	744	152	358

COG-1 (a-n)	Total Feedwater		Total Condensate		Aux
Subsection:	l	l	m	m	n
	mlb/hr	deg F	mlb/hr	deg F	
Jan-20	1636	250	426	-	N/A
Feb-20	1583	250	452	-	N/A
Mar-20	1749	250	481	-	N/A
Apr-20	1689	250	540	-	N/A
May-20	1683	250	522	-	N/A
Jun-20	1765	250	428	-	N/A
Jul-20	1746	250	374	-	N/A
Aug-20	1738	250	395	-	N/A
Sep-20	1702	250	391	-	N/A
Oct-20	1561	250	403	-	N/A
Nov-20	1664	250	444	-	N/A
Dec-20	1741	250	438	-	N/A

DEMAND CONFORMANCE CONDITIONS OF CERTIFICATION

DC-2 The Energy Commission shall retain jurisdiction to require ARCO to periodically report on the performance of its facility and the payments made by SCE to purchase power from the facility.

Verification: On an annual basis following construction, ARCO shall report the monthly generation provided to SCE and the monthly payments received from SCE. Payments shall be disaggregated by capacity (firm and as-available), start-up and energy. ARCO shall provide the CEC a copy of the Prescribed Dispatch Schedule for the facility.

Response: Monthly values for generation provided to SCE and monthly payments disaggregated by capacity (firm and as-available) are included in the table below. Watson no longer follows a Prescribed Dispatch Schedule from SCE. All power is baseload firm under current PPA.

DC-2: Demand Conformance Conditions of Certification - 2020				
Month	**SCE Sales Volume** *MWh*	**Energy Payment** *$*	**Capacity Payment - Firm** *$*	**Capacity Payment - As Available** *$*
Jan-20	197,621	$9,195,768.56	$359,000.47	$0.00
Feb-20	141,511	$4,023,950.41	$299,762.69	$0.00
Mar-20	209,708	$4,957,690.20	$359,000.47	$0.00
Apr-20	204,261	$4,222,426.39	$359,000.47	$0.00
May-20	168,349	$4,015,641.87	$295,875.58	$0.00
Jun-20	190,026	$4,500,261.93	$3,791,891.48	$0.00
Jul-20	191,400	$4,607,259.64	$3,674,579.92	$0.00
Aug-20	198,322	$8,698,851.57	$3,791,891.48	$0.00
Sep-20	186,533	$7,215,997.21	$3,791,538.22	$0.00
Oct-20	145,782	$5,847,864.58	$262,719.94	$0.00
Nov-20	183,740	$7,637,319.29	$339,205.90	$0.00
Dec-20	195,153	$9,322,230.95	$357,597.73	$0.00
Total	**2,212,407**	**$74,245,262.60**	**$17,682,064.35**	**$0.00**

PUBLIC HEALTH CONDITIONS OF CERTIFICATION

PH-2 APPC shall comply with all emission regulations established by the U.S. Environmental Protection Agency (EPA), South Coast Air Quality Management District (SCAQMD), and the California Air Resources Board (CARB) regarding the use of a non-chromium treatment method as an anti-fouling/corrosive agent in the cooling towers, and the prohibition of Hexavalent Chromium additives.

Verification: APPC shall submit to the CEC, within the Annual Compliance Report, documentation of their compliance with all EPA, SCAQMD, and CARB emission regulations for use of antifouling/corrosive agents in the cooling towers.

Response: In compliance with EPA, SCAQMD and CARB emission regulations for the use of antifouling/corrosive agents in cooling towers, APPC/Watson does not use any chemical products that contain chromium in its cooling towers. It is currently using Nalco 3D TRASAR 3DT199, a non-chromium product, as an anti-fouling agent in its cooling towers.

POWER PLANT RELIABILITY CONDITIONS OF CERTIFICATION

RELI-3 APPC shall file with the CEC an annual report documenting the plant availability and capacity factors achieved.

Verification: Beginning with commercial operation, APPC shall file an annual report containing the following:

a. Operating hours, outage hours, cause of outage and downtime for each piece of major equipment including the following:
   - Combustion turbine/generators - Heat recovery steam generators
   - Feedwater pumps

- Steam turbine/generators
- Condensers
- Condensate pumps
- Cooling water pumps
- Controls

b. For each forced outage, a precise identification of the equipment whose failure resulted in the forced outage and the resulting forced outage hours.
c. Identification of equipment or other causes (such as curtailment) for which planned outage was instituted in any given month.
d. Annual plant availability and capacity factors, per EPRI definitions.

Response: Information regarding operating hours, outage causes, downtime and annual plant availability and capacity factors are shown in the two tables below.

RELI-3: Power Plant Reliability - 2020					
CEC Generator Unit ID	Event Type	Start Date	End Date	Duration	Cause Code
GN91	MO - Maintenance	01/31/2020 23:05 PPT	02/09/2020 15:12 PPT	16:07	6090 - Other HRSG tube Problems
GN91	MO - Maintenance	05/03/2020 21:10 PPT	05/09/2020 15:37 PPT	18:27	0410 - Other burner problems
GN91	U1 - Forced - Immediate	05/13/2020 12:02 PPT	05/21/2020 14:05 PPT	194:03:00	4700 - Generator voltage control
GN91	MO - Maintenance	07/24/2020 23:25 PPT	07/31/2020 10:56 PPT	155:31:00	1350 - Other miscellaneous boiler tube problems
GN91	PO - Planned	10/09/2020 21:02 PPT	10/23/2020 13:56 PPT	328:54:00	5670 - Hot end inspection A
GN91	SF - Startup Failure	10/23/2020 13:57 PPT	10/29/2020 17:44 PPT	3:47	4740 - Emergency generator trip devices
GN91	MO - Maintenance	11/06/2020 21:00 PPT	11/07/2020 11:14 PPT	14:14:00	5109 - Other exhaust problems (including high exhaust system temperature not attributable to a specific problem)
GN91	U2 - Forced - Delayed	11/13/2020 09:03 PPT	11/13/2020 21:50 PPT	12:47	0520 - Other main steam valves (including vent and drain valves but not including the turbine stop valves) A
GN92	MO - Maintenance	01/24/2020 21:00 PPT	01/27/2020 11:17 PPT	14:17	5509 - Other exhaust problems (including high exhaust temperature not attributable to a specific problem)
GN93	PO - Planned	02/14/2020 21:02 PPT	02/28/2020 17:50 PPT	332:48:00	5670 - Hot end inspection A
GN93	MO - Maintenance	05/10/2020 21:05 PPT	05/13/2020 23:47 PPT	2:42	0410 - Other burner problems
GN95	U1 - Forced - Immediate	05/30/2020 08:35 PPT	06/10/2020 13:56 PPT	269:21:00	4305 - Automatic turbine control systems - mechanical - hydraulic
GN95	U1 - Forced - Immediate	06/16/2020 10:39 PPT	07/08/2020 11:20 PPT	528:41:00	4305 - Automatic turbine control systems - mechanical - hydraulic
GN95	RS - Reserve Shutdown	07/24/2020 18:40 PPT	08/17/2020 10:54 PPT	16:14	0000 - Reserve shutdown
GN95	RS - Reserve Shutdown	08/21/2020 18:12 PPT	09/06/2020 07:18 PPT	373:06:00	0000 - Reserve shutdown
GN95	U1 - Forced - Immediate	09/08/2020 18:58 PPT	09/17/2020 07:53 PPT	204:55:00	4260 - Main stop valves
GN95	RS - Reserve Shutdown	10/02/2020 22:24 PPT	10/14/2020 13:22 PPT	278:58:00	0000 - Reserve shutdown
GN96	RS - Reserve Shutdown	01/01/2020 00:00 PPT	04/21/2020 10:36 PPT	2673:36:00	0000 - Reserve shutdown
GN96	RS - Reserve Shutdown	04/27/2020 21:20 PPT	05/30/2020 09:04 PPT	779:44:00	0000 - Reserve shutdown
GN96	RS - Reserve Shutdown	09/17/2020 07:48 PPT	09/25/2020 11:14 PPT	195:26:00	0000 - Reserve shutdown
GN96	RS - Reserve Shutdown	10/14/2020 16:32 PPT	11/27/2020 07:00 PPT	1047:28:00	0000 - Reserve shutdown
GN96	PO - Planned	11/27/2020 07:01 PPT	12/31/2020 23:59 PPT	832:58:00	4400 - Major turbine overhaul (720 hrs or longer) (use for non-specific overhaul only; see page B-1)

RELI-3: Operating Hours and Availability - 2020		
CEC Generator Unit ID	2020 Operating Hours	2020 Availability
GN91	7,584	86.4%
GN92	8,721	99.3%
GN93	8,377	95.2%
GN94	8,784	100.0%
GN95	6,443	73.4%
GN96	3,254	37.0%
2020 Annual Plant Availability		81.87%
2020 Capacity Factor		84.83%

PUBLIC AND WORKER SAFETY CONDITIONS OF CERTIFICATION

SAFETY-11 APPC and the Los Angeles County Fire Department shall annually reexamine the fire protection program.

Verification: APPC shall note and summarize the joint re-examination to the fire protection program in its annual compliance report to the CEC.

Response: APPC/Watson's fire protection program is covered by a permit issued by the County of Los Angeles Fire Department and follows their standard review/renewal cycle. This review/renewal process is jointly conducted with the on-site Fire Chief responsible for the APPC/Watson facility. Fire protection equipment at the facility is inspected, tested and maintained in accordance with NFPA, ANSI and OSHA standards.

SAFETY-13 APPC shall facilitate onsite worker safety inspections conducted by Cal/DOSH during construction and operation of the facility when an employee complaint has been received.

Verification: APPC shall request Cal/DOSH to notify the CEC in writing in the event of a violation that will involve Cal/DOSH action affecting the construction and operation schedule and shall notify the CEC of the necessary corrective action. APPC shall note any Cal/DOSH inspections and actions in its periodic compliance reports.

Response: In the calendar year of 2020, APPC/Watson Cogen has not had any violations or nor received any complaints that would need to be reported to Cal/DOSH.

TRAFFIC AND TRANSPORTATION CONDITIONS OF CERTIFICATION

TRANS-1 ARCO Petroleum Products Corporation (APPC) shall comply with the California Department of Transportation (Caltrans) and Los Angeles County restrictions on oversize or overweight vehicles using state, county and City of Carson roadways. APPC shall obtain overload permits, as necessary, from Caltrans and the County of Los Angeles.

Verification: APPC shallow in its annual compliance report, notify the California Energy Commission (CEC) of any overload permits obtained from Caltrans and the County of Los Angeles.

Response: In the 2020 calendar year, APPC/Watson is not aware of any overload permits being obtained from Caltrans and the County of Los Angeles.

TRANS-2 APPC shall comply with the City of Carson encroachment and excavation permit and franchise requirements for installation of utility services (transmission line, natural gas pipeline) of the proposed project in or over city-owned rights-of-way.

Verification: APPC shall, in its annual compliance report, notify the CEC that the requirements

for obtaining encroachment and excavation permits from the City of Carson have been satisfied. APPC shall file any required or requested information with the City of Carson.

Response: In the 2020 calendar year, APPC/Watson is not aware of any filings for encroachment and/or excavation permits from the City of Carson.

WASTE MANAGEMENT CONDITIONS OF CERTIFICATION

WASTE-5 If APPC intends to store hazardous wastes on-site for more than 90 days, it shall obtain a determination from DHS that the requirements of a hazardous waste facility have been satisfied. Storage of such wastes shall be in accordance with DHS regulations. APPC shall file any required or requested information with the Los Angeles County Fire Department, Hazardous Materials Unit.

Verification: APPC shall notify the CEC in the Annual Compliance Report if APPC applies for, or obtains, a Hazardous Waste Facility permit.

Response: APPC/Watson does not store bulk hazardous waste onsite for more than 90 days and therefore does not require a Hazardous Waste Facility Permit.

WASTE-6 APPC shall ensure that hazardous wastes are hauled by a permitted hazardous wastes hauler and disposed of in a proper manner at a site permitted by DHS and the Regional Water Quality Control Board, Los Angeles Region, for the disposal of hazardous wastes.

Verification: In the Annual Compliance Report, APPC shall submit to the CEC a verification that hazardous wastes have been transported by a DHS-licensed hazardous waste hauler, and that the wastes were disposed of at appropriate sites.

Response: Hazardous waste generated by APPC/Watson is transported by a DTSC licensed hazardous waste hauler and is disposed of in a proper manner at permitted hazardous waste facilities.

WATER QUALITY CONDITIONS OF CERTIFICATION

WQ-4 The project owner shall provide a copy of the revised or new National Pollutant Discharge Elimination System Permit for the Watson Cogeneration Project and the ARCO Los Angeles Refinery approved by the Los Angeles Regional Water Quality Control Board to the CEC Compliance Project Manager. The project owner shall also provide a copy of the annual monitoring report required by the NPDES Permit for all wastewater, with the exception of stormwater runoff, that is commingled with cooling tower blowdown from the Watson Cogeneration Plant and discharged to the Dominguez Channel.

Verification: The project owner shall provide a copy of the new NPDES Permit to the CEC

Compliance Project Manager within one month of its approval by the Los Angeles Regional Water Quality Control Board. Annual NPDES Permit monitoring reports shall be provided to the CEC Compliance Project Manager with the annual compliance report.

Response: Annual NPDES reports for the Carson facility are submitted electronically on the California Integrated Water Quality System (CIWQS). A copy of the annual NPDES report has been included at the end of this annual compliance report. A copy of the updated NPDES permit can be provided if requested by the CEC.

WATER RESOURCES CONDITIONS OF CERTIFICATION

WATER-3 The project owner will demonstrate that all feasible and practical measures to reduce additional water demand have been incorporated into the design of the fifth train. The measures may include, but are not limited to, recycling and reuse.

Verification: The project owner shall submit a report discussing all measures, whether adopted or not, considered to reduce project water demand. This report shall be contained in the first annual compliance report following the start of operation of the fifth train.

Response: Water-3 is not applicable as APPC/Watson did not construct a fifth train.

Robert Nguyen
Environmental Department

Tesoro Refining & Marketing Company LLC
A subsidiary of Marathon Petroleum Corporation

Los Angeles Refinery – Carson Operations
2350 E. 223rd Street
Carson, California 90810
310-816-8100

January 25, 2021

NPDES Permit No. CA0000680
Order No. R4-2015-0259

NO DISCHARGE DURING MONITORING PERIOD

VIA Certified Mail
Return Receipt Requested

California Regional Water Quality Control Board
Los Angeles Region
320 W. 4th Street, Suite 200
Los Angeles, CA 90013
Attn: Information Technology Unit

Re: 2020 Annual NPDES Self-Monitoring Report
Tesoro Refining and Marketing Company LLC
Los Angeles Refinery – Carson Operations
1801 East Sepulveda Boulevard, Carson, California
Reporting Period: January 1, 2020 – December 31, 2020

To Whom It May Concern,

Please find enclosed the Annual NPDES Self-Monitoring Report for the Tesoro Refining and Marketing Company, Los Angeles Refinery – Carson Operations for the period of January 1, 2020 through December 31, 2020.

During the 2020 reporting period all process wastewater and wastewater commingled with storm water was discharged to the Los Angeles County Sanitation District (LACSD) in compliance with Industrial Wastewater Permit No. 21299. Discharge of Low Volume Waste to the Dominguez Channel Estuary, as authorized by NPDES Order No. R4-2015-0259, did not occur during the 2020 reporting year at any of the permitted Outfalls.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

If you have any questions, please contact me by phone at 310-847-5645 or by email at RTNguyen@marathonpetroleum.com.

Sincerely,

Robert Nguyen
Environmental Manager

Enclosure

cc: Env File 4E03

NPDES Annual Self-Monitoring Report

Tesoro Refining & Marketing Company LLC

Tesoro Los Angeles Refinery – Carson Operations

1801 East Sepulveda Boulevard

Carson, California 90749

NPDES Permit No. CA0000680

Order No. R4-2015-0259

Reporting Period:

January 1, 2020 – December 31, 2020

Report Prepared On:

January 21, 2021

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Attachments

Attachment 1: Annual Comprehensive Site Compliance Evaluation

Attachment 2: Annual Rainfall Data

Attachment 3: Sediment Monitoring Report

Part 1 – Compliance Summary

1. NPDES Permit Compliance Summary

   There were no discharges of Low Volume Wastes through Discharge Points 001, 002, 003, 004 or 005 or Process Wastewater Commingled with Storm Water and Boiler Blowdown through Discharge Points 003 or 004 to the Dominguez Channel Estuary at the Los Angeles Refinery – Carson Operations (LARC) in calendar year 2020. Therefore, there were no violations of discharge limits or Waste Discharge Requirements (WDRs).

2. NPDES Incident Release Report

   Table 1 provides incidental releases to the Dominguez Channel Estuary during the 2020 calendar year.

TABLE 1: 2020 Spills to the Dominguez Channel Estuary

Date	Time	Material	Spill Amount	Comments
6/24/2020	13:05	Firewater	Approximately 1,000 gal	On 6/24/2020 a brush fire ignited in the channel while a county contractor was clearing the overgrowth from the channel. LARC responded using firewater to extinguish the fire.

Part 2 – Summary of Monitoring Parameters

1. Presentation of Effluent Monitoring Data

   There were no discharges of Low Volume Wastes through Discharge Points 001, 002, 003, 004 or 005 or Process Wastewater Commingled with Storm Water and Boiler Blowdown through Discharge Points 003 or 004 to the Dominguez Channel Estuary at LARC in calendar year 2020. Therefore, no effluent monitoring was required.

2. Changes in Discharge

   There were no discharges of Low Volume Wastes through Discharge Points 001, 002, 003, 004 or 005 or Process Wastewater Commingled with Storm Water and Boiler Blowdown through Discharge Points 003 or 004 to the Dominguez Channel Estuary at LARC in calendar year 2020. There were no changes in the discharge as described in Order R4-2015-0259.

Part 3 – Other Monitoring

1. SWPPP, BMPP, and Spill Contingency Plan and Effectiveness Report

   There were no discharges of Low Volume Wastes through Discharge Points 001, 002, 003, 004 or 005 or Process Wastewater Commingled with Storm Water and Boiler Blowdown through Discharge Points 003 or 004 to the Dominguez Channel Estuary at LARC in calendar year 2020. Therefore, there were no issues with the effectiveness of the Storm Water

However, internal policy dictates the annual review of all facility environmental plans. The SWPPP, which also serves as the Best Management Practices Plan (BMPP), was reviewed in September 2020. The Spill Contingency Plan (Spill Prevention Control & Countermeasure (SPCC) Plan) was last reviewed in January 2020 with a Technical Amendment planned for July 2021.

2. Chemical Use Report

Table 2 provides the chemical usage report summarizing the quantities of all chemicals used at the facility, which are discharged or have the potential to be discharged. There were no discharges of Low Volume Wastes, including chemicals, through Discharge Points 001, 002, 003, 004 or 005 to the Dominguez Channel Estuary at LARC during the 2020 calendar year. LARC diverts cooling tower blowdown, boiler blowdown, and commingled storm water/wastewater to the wastewater treatment system before discharging to the Los Angeles County Sanitation District (LACSD) under Industrial Wastewater Permit No. 21299.

TABLE 2: Chemical Usage Report

Product ID	Chemical Name/Common Name	Amount	Units
3DT129	3D Trasar™ 3DT129/Corrosion inhibitor	161,547	LBS
Ultam120	Neutralizing Amine	338,782	LBS
7357	NALCO® 7357/Corrosion inhibitor	8,404	LBS
71D5Plus	NALCO® 71D5 Plus/Antifoam	7,055	LBS
73550	Biodispersant/Surfactant	54,743	LBS
7330	Non-oxidizing Biocide	1,711	LBS
1338	ACTI-BROM™ 1338/Bromine Biocide	60,021	LBS
8735	NALCO® 8735/Alkalinity Source	59,661	LBS
1742	NALCO® 1742/Boiler Water Treatment	43,175	LBS
72350	Neutralizing Amine	8,025	LBS
1720	NALCO® 1720/Oxygen Scavenger	59,381	LBS
22341	NALCO® 22341/Boiler Water Treatment	58,661	LBS
352	Neutralizing Amine	1,896	LBS
EC1001A	Neutralizing Amine	58,015	LBS
22310	NexGuard® 22310/Boiler Water Treatment	98,541	LBS
3DT304	3D Trasar™ 3DT041/Scale Inhibitor	442,948	LBS
3DT184	3D Trasar™ 3DT184/Corrosion Inhibitor	18,940	LBS

TABLE 2: Chemical Usage Report			
Product ID	**Chemical Name/Common Name**	**Amount**	**Units**
3DT199	3D Trasar™ 3DT199/ Corrosion Inhibitor	7,822	LBS
3DT391	3D Trasar™ 3DT391/Scale Inhibitor	62,781	LBS
3DT180	3D Trasar™ 3DT80/Corrosion inhibitor	6,329	LBS
Eliminox	NALCO® ELIMIN-OX™/Oxygen Scavenger	51,304	LBS
N/A	Bleach[1]	4,046,534	LBS
N/A	Sulfuric Acid[2]	4,330	LBS

3. Receiving Water Monitoring

   There were no discharges of Low Volume Wastes through Discharge Points 001, 002, 003, 004 or 005 or Process Wastewater Commingled with Storm Water and Boiler Blowdown through Discharge Points 003 or 004 to the Dominguez Channel Estuary at LARC in calendar year 2020. Therefore, no receiving water sampling and associated visual observation was required.

   Visual observations of the upstream and downstream receiving water sampling points was performed during 2020. Visual observations were performed at least monthly during January through December. No findings related to facility operations were reported on the visual observation logs.

4. Annual Comprehensive Site Compliance Evaluation

   The Annual Comprehensive Site Compliance Evaluation (ACSCE) was conducted by qualified personnel on January 13, 2021. See Attachment 1 for documentation.

5. Storm Water/Rainfall Monitoring

   Daily rainfall data for the 2020 calendar year as provided by the National Oceanic and Atmospheric Administration (NOAA) for the Long Beach Airport is included in Attachment 2.

6. Sediment Monitoring

   Although there were no discharges of Low Volume Wastes through Discharge Points 001, 002, 003, 004 or 005 or Process Wastewater Commingled with Storm Water and Boiler Blowdown through Discharge Points 003 or 004 to the Dominguez Channel Estuary at LARC in calendar year 2020, sediment monitoring was conducted on April 30, 2020 and

[1] This quantity assumes 20% of total annual facility bleach usage for use in cooling towers and boilers.

[2] This quantity assumes 1% of total annual facility sulfuric acid usage for use in cooling towers and boilers.

October 8, 2020 in accordance with Attachment E, Section VIII.D of the permit order. Copies of the sediment reports are included in Attachment 3.

Certification

We report that there were no discharges of Low Volume Wastes to the Dominguez Channel Estuary through Discharge Points 001, 002, 003, 004 or 005 or Process Wastewater Commingled with Storm Water and Boiler Blowdown through Discharge Points 003 or 004 during the reporting period of January 1, 2020 – December 31, 2020, under the above-mentioned order.

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Robert Nguyen
(Print Name)

Environmental Manager
(Title)

Certified via CIWQS
(Signature)

Attachment 1

Annual Comprehensive Site Compliance Evaluation (ACSCE)				
Facility Name:	Tesoro Los Angeles Refinery - Carson Operations	**Date:**	1-13-2021	**Page** 1 **of** 3
Inspector's Name/Signature:	Amber Ballrot	**Inspector's Title:**	Environmental Compliance Specialist	

Has it been 8-16 months since the last Annual Evaluation?	☒ YES ☐ NO ☐ N/A
Was a review of all sampling, visual observations, and inspection records conducted during the previous reporting year?	☒ YES ☐ NO ☐ N/A
Were all industrial activities and associated potential pollutants sources inspected for evidence of, or the potential for, entering the storm water conveyance system?	☒ YES ☐ NO ☐ N/A
Were all drainage areas previously identified as having no exposure to industrial activities and materials inspected?	☒ YES ☐ NO ☐ N/A
Was all equipment used to implement BMPs inspected?	☒ YES ☐ NO ☐ N/A
Were all BMPs inspected?	☒ YES ☐ NO ☐ N/A
Was the Storm Water Pollution Prevention Plan and Monitoring Implementation Plan reviewed?	☒ YES ☐ NO ☐ N/A
Are revisions to the Storm Water Pollution Prevention Plan and Monitoring Implementation Plan needed?	☒ YES ☐ NO ☐ N/A

Section/Page Number	Date Revised or Planned Date of Revision	Revision Description
Section 3.1	July 2021	Update Pollution Prevention Team, as applicable
Attachment B	July 2021	Update spill list, as applicable

Annual Comprehensive Site Compliance Evaluation (ACSCE) continued					
Attach an explanation page if more room is needed. Please make copy of form if more rows are needed.					**Page 2 of 3**
Potential Pollutant Source/Industrial Activity (as identified in your SWPPP) Northeast Facility Area - Gas flares - Cooling Towers - Railroad - Ineos Polypropylene	Have any BMPs not been fully implemented?	☐ YES ☒ NO	If yes, to any of the three questions, complete the next two columns of this form.	Describe deficiencies in BMPs or BMP implementation	Describe additional/revised BMPs or corrective actions and their date(s) of implementation
	Are any BMPs not effective in reducing and preventing pollutants in storm water discharges and NSWDs?	☐ YES ☒ NO			
	Are additional/revised BMPs necessary?	☐ YES ☒ NO			
Potential Pollutant Source/Industrial Activity (as identified in your SWPPP) Northwest Facility Area - Cogen - Maintenance - Warehousing - Hydrocracker/ FCC/LRU	Have any BMPs not been fully implemented?	☐ YES ☒ NO	If yes, to any of the three questions, complete the next two columns of this form.	Describe deficiencies in BMPs or BMP implementation	Describe additional/revised BMPs or corrective actions and their date(s) of implementation
	Are any BMPs not effective in reducing and preventing pollutants in storm water discharges and NSWDs?	☐ YES ☒ NO			
	Are additional/revised BMPs necessary?	☐ YES ☒ NO			
Potential Pollutant Source/Industrial Activity (as identified in your SWPPP) Tank Farm	Have any BMPs not been fully implemented?	☐ YES ☒ NO	If yes, to any of the three questions, complete the next two columns of this form.	Describe deficiencies in BMPs or BMP implementation	Describe additional/revised BMPs or corrective actions and their date(s) of implementation
	Are any BMPs not effective in reducing and preventing pollutants in storm water discharges and NSWDs?	☐ YES ☒ NO			
	Are additional/revised BMPs necessary?	☐ YES ☒ NO			

Annual Comprehensive Site Compliance Evaluation (ACSCE) continued					
Attach an explanation page if more room is needed. Please make copy of form if more rows are needed.					Page 3 of 3
Potential Pollutant Source/Industrial Activity (as identified in your SWPPP) Discharge Point 001 002 003 004 005	Have any BMPs not been fully implemented?	☐ YES ☒ NO	If yes, to any of the three questions, complete the next two columns of this form.	Describe deficiencies in BMPs or BMP implementation	Describe additional/revised BMPs or corrective actions and their date(s) of implementation
	Are any BMPs not effective in reducing and preventing pollutants in storm water discharges and NSWDs?	☐ YES ☒ NO			
	Are additional/revised BMPs necessary?	☐ YES ☒ NO			

Attachment 2

Explanation of the Preliminary Monthly Climate Data (F6) Product

These data are preliminary and have not undergone final quality control by the National Climatic Data Center (NCDC). Therefore, these data are subject to revision. Final and certified climate data can be accessed at the NCDC - http://www.ncdc.noaa.gov.

WFO Monthly/Daily Climate Data

```
000
CXUS56 KLOX 011655
CF6LGB
PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6)

                                        STATION:   LONG BEACH AIRPORT CA
                                        MONTH:     JANUARY
                                        YEAR:      2020
                                        LATITUDE:   33 49 N
                                        LONGITUDE: 118  9 W
```

TEMPERATURE IN F:							:PCPN:		SNOW:	WIND			:SUNSHINE:		SKY		:PK WND	
1	2	3	4	5	6A	6B	7	8	9	10	11	12	13	14	15	16	17	18
									12Z	AVG	MX	2MIN						
DY	MAX	MIN	AVG	DEP	HDD	CDD	WTR	SNW	DPTH	SPD	SPD	DIR	MIN	PSBL	S-S	WX	SPD	DR
1	65	45	55	-1	10	0	0.00	0.0	0	2.4	9	100	M	M	0	18	12	200
2	65	48	57	1	8	0	0.00	0.0	0	2.5	9	170	M	M	1	1	11	170
3	69	46	58	2	7	0	0.00	0.0	0	1.9	8	190	M	M	0	18	11	170
4	67	44	56	0	9	0	0.00	0.0	0	1.8	9	290	M	M	0	18	11	290
5	69	43	56	0	9	0	0.00	0.0	0	2.1	9	300	M	M	2	128	12	210
6	78	42	60	4	5	0	0.00	0.0	0	5.3	15	50	M	M	0		20	30
7	77	49	63	7	2	0	0.00	0.0	0	4.2	13	290	M	M	0		15	290
8	61	48	55	-2	10	0	0.00	0.0	0	2.4	9	220	M	M	3	12	13	200
9	61	48	55	-2	10	0	T	M	0	4.1	16	280	M	M	3		22	280
10	61	43	52	-5	13	0	0.00	0.0	0	2.2	9	210	M	M	1	18	17	140
11	61	42	52	-5	13	0	0.00	0.0	0	1.7	12	150	M	M	2	18	16	140
12	62	43	53	-4	12	0	0.00	0.0	0	2.3	12	190	M	M	1	18	15	210
13	62	47	55	-2	10	0	0.00	0.0	0	2.2	10	200	M	M	3	18	13	200
14	63	43	53	-4	12	0	0.00	0.0	0	2.3	10	220	M	M	1	18	14	220
15	64	43	54	-3	11	0	0.00	0.0	0	2.2	9	290	M	M	0	18	12	200
16	59	45	52	-5	13	0	0.06	M	0	4.0	13	290	M	M	8	18	16	290
17	60	46	53	-4	12	0	0.15	M	0	3.1	10	50	M	M	4	1	12	50
18	72	45	59	2	6	0	0.00	0.0	0	4.6	10	330	M	M	0		13	300
19	74	45	60	3	5	0	0.00	0.0	0	3.3	9	300	M	M	0		11	300
20	62	52	57	0	8	0	0.00	0.0	0	3.0	9	130	M	M	4	18	12	270
21	60	49	55	-2	10	0	0.10	M	0	2.7	12	300	M	M	7	1	15	300
22	61	46	54	-3	11	0	0.00	0.0	0	1.9	10	180	M	M	2	18	13	190
23	74	47	61	4	4	0	0.00	0.0	0	4.4	13	300	M	M	0	1	15	290
24	66	47	57	0	8	0	0.00	0.0	0	3.0	9	190	M	M	3	18	12	180
25	64	50	57	0	8	0	0.00	0.0	0	3.3	8	130	M	M	5	128	11	340
26	58	52	55	-2	10	0	0.00	0.0	0	3.4	8	220	M	M	8	18	10	120
27	70	46	58	1	7	0	0.00	0.0	0	2.6	13	280	M	M	1	18	16	290
28	75	48	62	5	3	0	0.00	0.0	0	3.3	15	300	M	M	0		16	310
29	72	44	58	1	7	0	0.00	0.0	0	3.3	13	200	M	M	0		17	180
30	73	43	58	1	7	0	0.00	0.0	0	2.2	10	200	M	M	0		14	200
31	81	44	63	6	2	0	0.00	0.0	0	3.2	15	300	M	M	0		17	310
SM	2066	1423			262	0	0.31		0.0	90.9			M		59			
AV	66.7	45.9								2.9	FASTST		M	M	2	MAX(MPH)		

MISC ----> # 16 280 # 22 280

NOTES:
LAST OF SEVERAL OCCURRENCES

COLUMN 17 PEAK WIND IN M.P.H.

PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6) , PAGE 2

STATION: LONG BEACH AIRPORT CA
MONTH: JANUARY
YEAR: 2020
LATITUDE: 33 49 N
LONGITUDE: 118 9 W

[TEMPERATURE DATA]

AVERAGE MONTHLY: 56.3
DPTR FM NORMAL: -0.4
HIGHEST: 81 ON 31
LOWEST: 42 ON 11, 6

[PRECIPITATION DATA]

TOTAL FOR MONTH: 0.31
DPTR FM NORMAL: -2.29
GRTST 24HR 0.15 ON 17-17

SNOW, ICE PELLETS, HAIL
TOTAL MONTH: 0.0 INCH
GRTST 24HR 0.0
GRTST DEPTH: 0

SYMBOLS USED IN COLUMN 16

1 = FOG OR MIST
2 = FOG REDUCING VISIBILITY TO 1/4 MILE OR LESS
3 = THUNDER
4 = ICE PELLETS
5 = HAIL
6 = FREEZING RAIN OR DRIZZLE
7 = DUSTSTORM OR SANDSTORM: VSBY 1/2 MILE OR LESS
8 = SMOKE OR HAZE
9 = BLOWING SNOW
X = TORNADO

[NO. OF DAYS WITH]

MAX 32 OR BELOW: 0
MAX 90 OR ABOVE: 0
MIN 32 OR BELOW: 0
MIN 0 OR BELOW: 0

[WEATHER - DAYS WITH]

0.01 INCH OR MORE: 3
0.10 INCH OR MORE: 2
0.50 INCH OR MORE: 0
1.00 INCH OR MORE: 0

[HDD (BASE 65)]

TOTAL THIS MO. 262
DPTR FM NORMAL 3
TOTAL FM JUL 1 644
DPTR FM NORMAL -35

CLEAR (SCALE 0-3) 23
PTCLDY (SCALE 4-7) 6
CLOUDY (SCALE 8-10) 2

[CDD (BASE 65)]

TOTAL THIS MO. 0
DPTR FM NORMAL -3
TOTAL FM JAN 1 0
DPTR FM NORMAL 0

[PRESSURE DATA]

HIGHEST SLP 30.37 ON 4
LOWEST SLP 29.88 ON 1

[REMARKS]
#FINAL-01-20#

These data are preliminary and have not undergone final quality control by the National Climatic Data Center (NCDC). Therefore, these data are subject to revision. Final and certified climate data can be accessed at the NCDC - http://www.ncdc.noaa.gov.

Climatological Report (Monthly)

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000
CXUS56 KLOX 011527
CLMLGB


CLIMATE REPORT
NATIONAL WEATHER SERVICE LOS ANGELES/OXNARD CA
726 AM PST SAT FEB 1 2020

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...THE LONG BEACH AIRPORT CA CLIMATE SUMMARY FOR THE MONTH OF JANUARY 2020...

CLIMATE NORMAL PERIOD 1981 TO 2010
CLIMATE RECORD PERIOD 1958 TO 2020
```

WEATHER	OBSERVED VALUE	DATE(S)	NORMAL VALUE	DEPART FROM NORMAL	LAST YEAR`S VALUE
TEMPERATURE (F)					
HIGHEST	81	01/31			
LOWEST	42	01/11			
		01/06			
AVG. MAXIMUM	66.6		67.4	-0.8	
AVG. MINIMUM	45.9		46.1	-0.2	
MEAN	56.3		56.7	-0.4	
DAYS MAX >= 90	0				
DAYS MAX <= 32	0				
DAYS MIN <= 32	0				
DAYS MIN <= 0	0				
PRECIPITATION (INCHES)					
TOTALS	0.31		2.60	-2.29	
DAILY AVG.	0.01				
DAYS >= .01	3				
DAYS >= .10	2				
DAYS >= .50	0				
DAYS >= 1.00	0				
GREATEST					
24 HR. TOTAL	0.15	01/17 TO 01/17			
STORM TOTAL	MM				
(MM/DD(HH))					
DEGREE_DAYS					
HEATING TOTAL	262		259	3	213
SINCE 7/1	644		679	-35	426
COOLING TOTAL	0		3	-3	0
SINCE 1/1	0		0	0	0

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.....

WIND (MPH)
AVERAGE WIND SPEED              2.9
HIGHEST WIND SPEED/DIRECTION    16/280    DATE  01/09
HIGHEST GUST SPEED/DIRECTION    22/280    DATE  01/09
```

```
SKY COVER
POSSIBLE SUNSHINE (PERCENT)   MM
AVERAGE SKY COVER            0.20
NUMBER OF DAYS FAIR            25
NUMBER OF DAYS PC               4
NUMBER OF DAYS CLOUDY           2

AVERAGE RH (PERCENT)     68

WEATHER CONDITIONS. NUMBER OF DAYS WITH
  0
  2
  0
  0
  0
  0
  3
HAZE                      17

-  INDICATES NEGATIVE NUMBERS.
R  INDICATES RECORD WAS SET OR TIED.
MM INDICATES DATA IS MISSING.
T  INDICATES TRACE AMOUNT.
```

Explanation of the Preliminary Monthly Climate Data (F6) Product

These data are preliminary and have not undergone final quality control by the National Climatic Data Center (NCDC). Therefore, these data are subject to revision. Final and certified climate data can be accessed at the NCDC - http://www.ncdc.noaa.gov.

WFO Monthly/Daily Climate Data

000
CXUS56 KLOX 020714
CF6LGB
PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6)

STATION: LONG BEACH AIRPORT CA
MONTH: FEBRUARY
YEAR: 2020
LATITUDE: 33 49 N
LONGITUDE: 118 9 W

TEMPERATURE IN F:							:PCPN:		SNOW:	WIND			:SUNSHINE:		SKY		:PK WND	
1	2	3	4	5	6A	6B	7	8	9	10	11	12	13	14	15	16	17	18
									12Z	AVG	MX	2MIN						
DY	MAX	MIN	AVG	DEP	HDD	CDD	WTR	SNW	DPTH	SPD	SPD	DIR	MIN	PSBL	S-S	WX	SPD	DR
1	84	47	66	9	0	1	0.00	0.0	0	2.8	13	300	M	M	0		14	300
2	65	48	57	0	8	0	T	M	0	3.9	20	320	M	M	4	128	25	320
3	63	47	55	-2	10	0	0.00	0.0	0	14.7	26	340	M	M	1		33	320
4	61	44	53	-4	12	0	0.00	0.0	0	7.1	17	80	M	M	0		22	80
5	59	39	49	-8	16	0	0.00	0.0	0	2.6	12	210	M	M	0		15	210
6	63	42	53	-4	12	0	0.00	0.0	0	2.3	10	220	M	M	0		13	220
7	66	42	54	-3	11	0	0.00	0.0	0	2.6	9	300	M	M	0	18	12	150
8	66	47	57	0	8	0	0.00	0.0	0	3.3	15	300	M	M	3	128	17	310
9	57	53	55	-2	10	0	0.30	0.0	0	6.9	23	110	M	M	10	1	30	140
10	71	50	61	4	4	0	0.02	0.0	0	3.3	12	290	M	M	3		16	310
11	73	48	61	4	4	0	0.00	0.0	0	5.2	14	300	M	M	0	1	18	290
12	62	45	54	-3	11	0	0.00	0.0	0	2.6	10	190	M	M	0		14	170
13	68	45	57	0	8	0	0.00	0.0	0	3.9	13	300	M	M	1	18	16	290
14	67	45	56	-2	9	0	0.00	0.0	0	2.8	16	300	M	M	1	18	18	300
15	67	45	56	-2	9	0	0.00	0.0	0	3.2	13	300	M	M	2	128	14	310
16	66	47	57	-1	8	0	0.00	0.0	0	3.6	10	310	M	M	3	128	14	210
17	65	49	57	-1	8	0	0.00	0.0	0	3.0	12	200	M	M	3	128	14	200
18	67	53	60	2	5	0	0.00	0.0	0	3.4	13	190	M	M	5	18	16	190
19	65	54	60	2	5	0	0.00	0.0	0	3.6	10	170	M	M	4	8	14	180
20	77	49	63	5	2	0	0.00	0.0	0	2.8	9	310	M	M	1	18	11	300
21	71	51	61	3	4	0	T	0.0	0	5.0	13	180	M	M	5	138	18	170
22	63	55	59	1	6	0	0.01	0.0	0	5.4	15	290	M	M	8	3	19	290
23	65	54	60	2	5	0	0.00	0.0	0	3.9	12	300	M	M	4		15	210
24	70	48	59	1	6	0	0.00	0.0	0	2.9	14	300	M	M	0		16	290
25	81	49	65	7	0	0	0.00	0.0	0	2.6	12	290	M	M	0	18	13	290
26	80	52	66	8	0	1	0.00	0.0	0	5.3	18	290	M	M	0		21	290
27	84	51	68	10	0	3	0.00	0.0	0	3.8	10	40	M	M	0		12	330
28	86	57	72	14	0	7	0.00	0.0	0	4.1	12	180	M	M	0		16	190
29	66	55	61	3	4	0	T	0.0	0	6.5	13	170	M	M	3		18	150
SM	1998	1411		185	12	0.33		0.0	123.1				M		61			
AV	68.9	48.7								4.2	FASTST		M	M	2		MAX(MPH)	
								MISC. ---->		# 26	340						# 33	320

NOTES:
LAST OF SEVERAL OCCURRENCES

COLUMN 17 PEAK WIND IN M.P.H.

PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6) , PAGE 2

STATION: LONG BEACH AIRPORT CA
MONTH: FEBRUARY
YEAR: 2020
LATITUDE: 33 49 N
LONGITUDE: 118 9 W

[TEMPERATURE DATA]

AVERAGE MONTHLY: 58.8
DPTR FM NORMAL: 1.2
HIGHEST: 86 ON 28
LOWEST: 39 ON 5

[PRECIPITATION DATA]

TOTAL FOR MONTH: 0.33
DPTR FM NORMAL: -2.76
GRTST 24HR 0.30 ON 9- 9

SNOW, ICE PELLETS, HAIL
TOTAL MONTH: 0.0 INCH
GRTST 24HR 0.0
GRTST DEPTH: 0

SYMBOLS USED IN COLUMN 16

1 = FOG OR MIST
2 = FOG REDUCING VISIBILITY TO 1/4 MILE OR LESS
3 = THUNDER
4 = ICE PELLETS
5 = HAIL
6 = FREEZING RAIN OR DRIZZLE
7 = DUSTSTORM OR SANDSTORM: VSBY 1/2 MILE OR LESS
8 = SMOKE OR HAZE
9 = BLOWING SNOW
X = TORNADO

[NO. OF DAYS WITH]

MAX 32 OR BELOW: 0
MAX 90 OR ABOVE: 0
MIN 32 OR BELOW: 0
MIN 0 OR BELOW: 0

[WEATHER - DAYS WITH]

0.01 INCH OR MORE: 3
0.10 INCH OR MORE: 1
0.50 INCH OR MORE: 0
1.00 INCH OR MORE: 0

[HDD (BASE 65)]

TOTAL THIS MO. 185
DPTR FM NORMAL -27
TOTAL FM JUL 1 829
DPTR FM NORMAL -69

CLEAR (SCALE 0-3) 20
PTCLDY (SCALE 4-7) 8
CLOUDY (SCALE 8-10) 1

[CDD (BASE 65)]

TOTAL THIS MO. 12
DPTR FM NORMAL 7
TOTAL FM JAN 1 12
DPTR FM NORMAL 4

[PRESSURE DATA]

HIGHEST SLP 30.32 ON 26
LOWEST SLP 29.75 ON 9

[REMARKS]
#FINAL-02-20#

These data are preliminary and have not undergone final quality control by the National Climatic Data Center (NCDC). Therefore, these data are subject to revision. Final and certified climate data can be accessed at the NCDC - http://www.ncdc.noaa.gov.

Climatological Report (Monthly)

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000
CXUS56 KLOX 020712
CLMLGB


CLIMATE REPORT
NATIONAL WEATHER SERVICE LOS ANGELES/OXNARD CA
1111 PM PST SUN MAR 1 2020

.....................................

...THE LONG BEACH AIRPORT CA CLIMATE SUMMARY FOR THE MONTH OF FEBRUARY 2020...

CLIMATE NORMAL PERIOD 1981 TO 2010
CLIMATE RECORD PERIOD 1958 TO 2020

WEATHER          OBSERVED           NORMAL  DEPART  LAST YEAR'S
                  VALUE   DATE(S)   VALUE   FROM    VALUE
                                             NORMAL
.....................................................................
TEMPERATURE (F)
HIGHEST             86   02/28
LOWEST              39   02/05
AVG. MAXIMUM      68.9               67.2     1.7
AVG. MINIMUM      48.7               48.0     0.7
MEAN              58.8               57.6     1.2
DAYS MAX >= 90       0
DAYS MAX <= 32       0
DAYS MIN <= 32       0
DAYS MIN <= 0        0

PRECIPITATION (INCHES)
TOTALS            0.33               3.09   -2.76
DAILY AVG.        0.01
DAYS >= .01          3
DAYS >= .10          1
DAYS >= .50          0
DAYS >= 1.00         0
GREATEST
 24 HR. TOTAL     0.30   02/09 TO 02/09
 STORM TOTAL        MM
 (MM/DD(HH))

DEGREE_DAYS
HEATING TOTAL      185                212     -27      325
 SINCE 7/1         829                898     -69      751
COOLING TOTAL       12                  5       7        0
 SINCE 1/1          12                  8       4        0
.....................................................................

WIND (MPH)
AVERAGE WIND SPEED              4.2
HIGHEST WIND SPEED/DIRECTION    26/340    DATE  02/03
HIGHEST GUST SPEED/DIRECTION    33/320    DATE  02/03
```

```
SKY COVER
POSSIBLE SUNSHINE (PERCENT)   MM
AVERAGE SKY COVER            0.20
NUMBER OF DAYS FAIR            22
NUMBER OF DAYS PC               5
NUMBER OF DAYS CLOUDY           2

AVERAGE RH (PERCENT)      58

WEATHER CONDITIONS. NUMBER OF DAYS WITH
  0
  1
  0
  0
  0
  0
  5
HAZE                      13

-  INDICATES NEGATIVE NUMBERS.
R  INDICATES RECORD WAS SET OR TIED.
MM INDICATES DATA IS MISSING.
T  INDICATES TRACE AMOUNT.
```

Explanation of the Preliminary Monthly Climate Data (F6) Product

These data are preliminary and have not undergone final quality control by the National Climatic Data Center (NCDC). Therefore, these data are subject to revision. Final and certified climate data can be accessed at the NCDC - http://www.ncdc.noaa.gov.

WFO Monthly/Daily Climate Data

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000
CXUS56 KLOX 011655
CF6LGB
PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6)

                                        STATION:   LONG BEACH AIRPORT CA
                                        MONTH:     MARCH
                                        YEAR:      2020
                                        LATITUDE:   33 49 N
                                        LONGITUDE: 118  9 W

  TEMPERATURE IN F:       :PCPN:    SNOW:  WIND      :SUNSHINE: SKY     :PK WND
==========================================================================================
1   2   3   4   5  6A  6B    7    8   9   10  11  12  13   14  15   16   17  18
                                    12Z  AVG MX 2MIN
DY MAX MIN AVG DEP HDD CDD  WTR  SNW DPTH SPD SPD DIR MIN PSBL S-S WX    SPD DR
==========================================================================================

 1  61  51  56  -2   9   0 0.04  0.0    0  6.3 16 260   M    M   7 8      21 260
 2  72  46  59   0   6   0 0.00  0.0    0  4.9 18  60   M    M   1        25  60
 3  78  45  62   3   3   0 0.00  0.0    0  4.4 15 290   M    M   0        18 280
 4  66  52  59   0   6   0 0.00  0.0    0  3.5 13 200   M    M   3 1      16 230
 5  75  56  66   7   0   1 0.00  0.0    0  5.0 17 290   M    M   4 18     20 280
 6  65  55  60   1   5   0 0.00  0.0    0  6.1 13 310   M    M   5 18     17 180
 7  64  55  60   1   5   0    T  0.0    0  7.1 15 130   M    M   7        21 230
 8  64  52  58  -1   7   0 0.00  0.0    0  3.8 14 220   M    M   3        19 220
 9  72  50  61   2   4   0 0.09  0.0    0  3.7 18 170   M    M   2        27 150
10  65  56  61   2   4   0 0.08  0.0    0  7.8 16 150   M    M  10 1      21 170
11  70  58  64   5   1   0    T  0.0    0  4.7 13 230   M    M   5 1      15 200
12  59  54  57  -2   8   0 1.23  0.0    0  5.2 31 350   M    M   6 18     35 350
13  60  53  57  -2   8   0 0.50  0.0    0  2.2  9  10   M    M  10 1      11 200
14  61  55  58  -1   7   0 0.01  0.0    0  3.9 13 250   M    M  10        16 270
15  65  54  60   0   5   0 0.03  0.0    0  4.7 14 220   M    M   8 1      21 220
16  63  52  58  -2   7   0 0.27  0.0    0  7.0 20 150   M    M   9 1      29 160
17  60  47  54  -6  11   0    T    M    0  3.6 14 320   M    M   4        17 190
18  63  44  54  -6  11   0 0.00  0.0    0  8.0 20 280   M    M   0        27 280
19  61  52  57  -3   8   0 0.03  0.0    0  7.4 17 220   M    M   6 1      22 260
20  63  50  57  -3   8   0 0.00  0.0    0  5.3 12 160   M    M   4 1      17 150
21  65  52  59  -1   6   0 0.00  0.0    0  4.4 13 220   M    M   4        17 200
22  67  50  59  -1   6   0 0.71  0.0    0  4.6 14 100   M    M   5 1      18  90
23  64  52  58  -2   7   0 0.02  0.0    0  5.8 15 200   M    M   5        18 210
24  63  50  57  -3   8   0    T  0.0    0  5.3 15 290   M    M   7 18     19 280
25  63  53  58  -2   7   0    T  0.0    0  8.2 21 280   M    M   9        25 290
26  61  46  54  -6  11   0 0.00  0.0    0  9.0 22 260   M    M   0        30 260
27  65  45  55  -5  10   0 0.00  0.0    0  7.3 16 290   M    M   0         M  M
28  64  48  56  -4   9   0 0.00  0.0    0  5.0 15 300   M    M   1        17 300
29  66  49  58  -2   7   0 0.00  0.0    0  7.5 20 280   M    M   1        27 270
30  71  50  61   0   4   0 0.00  0.0    0  4.4 17 290   M    M   0        20 290
31  76  52  64   3   1   0 0.00  0.0    0  2.9 12 190   M    M   0 18     15 190
==========================================================================================
SM 2032 1584       199   1  3.01     0.0 169.0          M      136
==========================================================================================
AV 65.6 51.1                                  5.5 FASTST   M    M   4    MAX(MPH)
```

MISC ----> # 31 350 # 35 350

NOTES:
LAST OF SEVERAL OCCURRENCES

COLUMN 17 PEAK WIND IN M.P.H.

PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6) , PAGE 2

STATION: LONG BEACH AIRPORT CA
MONTH: MARCH
YEAR: 2020
LATITUDE: 33 49 N
LONGITUDE: 118 9 W

[TEMPERATURE DATA]

AVERAGE MONTHLY: 58.3
DPTR FM NORMAL: -1.3
HIGHEST: 78 ON 3
LOWEST: 44 ON 18

[PRECIPITATION DATA]

TOTAL FOR MONTH: 3.01
DPTR FM NORMAL: 1.14
GRTST 24HR 1.23 ON 12-12

SNOW, ICE PELLETS, HAIL
TOTAL MONTH: 0.0 INCH
GRTST 24HR 0.0
GRTST DEPTH: 0

SYMBOLS USED IN COLUMN 16

1 = FOG OR MIST
2 = FOG REDUCING VISIBILITY TO 1/4 MILE OR LESS
3 = THUNDER
4 = ICE PELLETS
5 = HAIL
6 = FREEZING RAIN OR DRIZZLE
7 = DUSTSTORM OR SANDSTORM: VSBY 1/2 MILE OR LESS
8 = SMOKE OR HAZE
9 = BLOWING SNOW
X = TORNADO

[NO. OF DAYS WITH]

MAX 32 OR BELOW: 0
MAX 90 OR ABOVE: 0
MIN 32 OR BELOW: 0
MIN 0 OR BELOW: 0

[WEATHER - DAYS WITH]

0.01 INCH OR MORE: 11
0.10 INCH OR MORE: 4
0.50 INCH OR MORE: 3
1.00 INCH OR MORE: 1

[HDD (BASE 65)]
TOTAL THIS MO. 199
DPTR FM NORMAL 20
TOTAL FM JUL 1 1028
DPTR FM NORMAL -42

CLEAR (SCALE 0-3) 12
PTCLDY (SCALE 4-7) 14
CLOUDY (SCALE 8-10) 5

[CDD (BASE 65)]
TOTAL THIS MO. 1
DPTR FM NORMAL -9
TOTAL FM JAN 1 13
DPTR FM NORMAL -5

[PRESSURE DATA]
HIGHEST SLP 30.25 ON 30
LOWEST SLP 29.74 ON 12

[REMARKS]
#FINAL-03-20#

These data are preliminary and have not undergone final quality control by the National Climatic Data Center (NCDC). Therefore, these data are subject to revision. Final and certified climate data can be accessed at the NCDC - http://www.ncdc.noaa.gov.

Climatological Report (Monthly)

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452
CXUS56 KLOX 011436
CLMLGB


CLIMATE REPORT
NATIONAL WEATHER SERVICE LOS ANGELES/OXNARD CA
735 AM PDT WED APR 1 2020

.....

...THE LONG BEACH AIRPORT CA CLIMATE SUMMARY FOR THE MONTH OF MARCH 2020...

CLIMATE NORMAL PERIOD 1981 TO 2010
CLIMATE RECORD PERIOD 1958 TO 2020
```

WEATHER	OBSERVED VALUE	DATE(S)	NORMAL VALUE	DEPART FROM NORMAL	LAST YEAR'S VALUE
TEMPERATURE (F)					
HIGHEST	78	03/03			
LOWEST	44	03/18			
AVG. MAXIMUM	65.5		68.6	-3.1	
AVG. MINIMUM	51.1		50.5	0.6	
MEAN	58.3		59.6	-1.3	
DAYS MAX >= 90	0				
DAYS MAX <= 32	0				
DAYS MIN <= 32	0				
DAYS MIN <= 0	0				
PRECIPITATION (INCHES)					
TOTALS	3.01		1.87	1.14	
DAILY AVG.	0.10				
DAYS >= .01	11				
DAYS >= .10	4				
DAYS >= .50	3				
DAYS >= 1.00	1				
GREATEST					
24 HR. TOTAL	1.23	03/12 TO 03/12			
STORM TOTAL (MM/DD(HH))	MM				
DEGREE_DAYS					
HEATING TOTAL	199		179	20	139
SINCE 7/1	1028		1070	-42	890
COOLING TOTAL	1		10	-9	12
SINCE 1/1	13		18	-5	12

```
.....

WIND (MPH)
AVERAGE WIND SPEED              5.5
HIGHEST WIND SPEED/DIRECTION    31/350    DATE  03/12
HIGHEST GUST SPEED/DIRECTION    35/350    DATE  03/12
```

```
SKY COVER
POSSIBLE SUNSHINE (PERCENT)   MM
AVERAGE SKY COVER            0.40
NUMBER OF DAYS FAIR            12
NUMBER OF DAYS PC              13
NUMBER OF DAYS CLOUDY           6

AVERAGE RH (PERCENT)      66

WEATHER CONDITIONS. NUMBER OF DAYS WITH
  0
  5
  0
  0
  0
  0
  0
HAZE                      6

-  INDICATES NEGATIVE NUMBERS.
R  INDICATES RECORD WAS SET OR TIED.
MM INDICATES DATA IS MISSING.
T  INDICATES TRACE AMOUNT.
```

Explanation of the Preliminary Monthly Climate Data (F6) Product

These data are preliminary and have not undergone final quality control by the National Climatic Data Center (NCDC). Therefore, these data are subject to revision. Final and certified climate data can be accessed at the NCDC - http://www.ncdc.noaa.gov.

WFO Monthly/Daily Climate Data

```
000
CXUS56 KLOX 011655
CF6LGB
PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6)

                                        STATION:   LONG BEACH AIRPORT CA
                                        MONTH:     APRIL
                                        YEAR:      2020
                                        LATITUDE:   33 49 N
                                        LONGITUDE: 118  9 W
```

TEMPERATURE IN F:							:PCPN:		SNOW:	WIND			:SUNSHINE:		SKY		:PK WND	
1	2	3	4	5	6A	6B	7	8	9	10	11	12	13	14	15	16	17	18
									12Z	AVG	MX	2MIN						
DY	MAX	MIN	AVG	DEP	HDD	CDD	WTR	SNW	DPTH	SPD	SPD	DIR	MIN	PSBL	S-S	WX	SPD	DR
1	66	57	62	1	3	0	0.00	0.0	0	6.4	12	120	M	M	5	1	16	210
2	67	58	63	2	2	0	0.00	0.0	0	6.4	14	160	M	M	7		19	180
3	66	55	61	0	4	0	0.00	0.0	0	5.5	14	220	M	M	3		23	320
4	65	54	60	-1	5	0	T	0.0	0	7.1	13	200	M	M	6		19	170
5	64	55	60	-1	5	0	0.14	0.0	0	6.8	14	210	M	M	9	1	22	180
6	61	55	58	-3	7	0	0.74	0.0	0	7.1	16	160	M	M	9	1	23	150
7	63	50	57	-4	8	0	0.82	0.0	0	4.2	18	290	M	M	10	1	25	250
8	61	50	56	-6	9	0	0.08	0.0	0	5.1	16	300	M	M	4	1	20	210
9	56	50	53	-9	12	0	0.89	0.0	0	5.7	12	80	M	M	8	1	14	90
10	63	50	57	-5	8	0	0.36	0.0	0	6.7	17	40	M	M	8	1	23	350
11	65	50	58	-4	7	0	0.00	0.0	0	5.6	14	200	M	M	2		21	160
12	62	57	60	-2	5	0	0.00	0.0	0	4.5	10	210	M	M	10		14	210
13	64	54	59	-3	6	0	0.00	0.0	0	4.6	10	310	M	M	7		15	210
14	74	51	63	1	2	0	0.00	0.0	0	5.6	17	290	M	M	2	18	20	280
15	80	53	67	5	0	2	0.00	0.0	0	4.6	18	300	M	M	0		22	290
16	67	55	61	-1	4	0	0.00	0.0	0	5.2	12	200	M	M	1	1	16	200
17	66	55	61	-2	4	0	0.00	0.0	0	6.2	14	220	M	M	5		M	M
18	65	58	62	-1	3	0	0.00	0.0	0	7.2	16	290	M	M	9		20	300
19	66	56	61	-2	4	0	0.00	0.0	0	6.7	17	300	M	M	7		23	320
20	67	57	62	-1	3	0	0.00	0.0	0	6.6	15	290	M	M	6		21	300
21	69	54	62	-1	3	0	0.00	0.0	0	5.4	15	290	M	M	1		19	310
22	80	55	68	5	0	3	0.00	0.0	0	4.2	16	290	M	M	0		20	290
23	85	59	72	9	0	7	0.00	0.0	0	3.8	12	150	M	M	0		13	210
24	93	61	77	13	0	12	0.00	0.0	0	5.8	18	290	M	M	0		22	300
25	80	59	70	6	0	5	0.00	0.0	0	5.1	10	180	M	M	1	1	13	200
26	82	58	70	6	0	5	0.00	0.0	0	4.6	12	290	M	M	5	128	13	300
27	70	59	65	1	0	0	0.00	0.0	0	4.6	13	220	M	M	4	18	19	200
28	72	61	67	3	0	2	0.00	0.0	0	5.5	13	180	M	M	4	18	17	170
29	70	61	66	2	0	1	0.00	0.0	0	4.6	14	200	M	M	6	18	18	200
30	72	61	67	3	0	2	0.00	0.0	0	5.8	13	210	M	M	6	18	16	180
SM	2081	1668		104	39	3.03		0.0	167.2				M		145			
AV	69.4	55.6								5.6	FASTST		M	M	5		MAX(MPH)	
								MISC ---->		# 18	290						# 25	250

NOTES:
LAST OF SEVERAL OCCURRENCES

COLUMN 17 PEAK WIND IN M.P.H.

PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6) , PAGE 2

STATION: LONG BEACH AIRPORT CA
MONTH: APRIL
YEAR: 2020
LATITUDE: 33 49 N
LONGITUDE: 118 9 W

[TEMPERATURE DATA]

AVERAGE MONTHLY: 62.5
DPTR FM NORMAL: 0.1
HIGHEST: 93 ON 24
LOWEST: 50 ON 11,10

[PRECIPITATION DATA]

TOTAL FOR MONTH: 3.03
DPTR FM NORMAL: 2.43
GRTST 24HR 0.89 ON 9- 9

SNOW, ICE PELLETS, HAIL
TOTAL MONTH: 0.0 INCH
GRTST 24HR 0.0
GRTST DEPTH: 0

SYMBOLS USED IN COLUMN 16

1 = FOG OR MIST
2 = FOG REDUCING VISIBILITY TO 1/4 MILE OR LESS
3 = THUNDER
4 = ICE PELLETS
5 = HAIL
6 = FREEZING RAIN OR DRIZZLE
7 = DUSTSTORM OR SANDSTORM: VSBY 1/2 MILE OR LESS
8 = SMOKE OR HAZE
9 = BLOWING SNOW
X = TORNADO

[NO. OF DAYS WITH]

MAX 32 OR BELOW: 0
MAX 90 OR ABOVE: 1
MIN 32 OR BELOW: 0
MIN 0 OR BELOW: 0

[WEATHER - DAYS WITH]

0.01 INCH OR MORE: 6
0.10 INCH OR MORE: 5
0.50 INCH OR MORE: 3
1.00 INCH OR MORE: 0

[HDD (BASE 65)]

TOTAL THIS MO. 104
DPTR FM NORMAL -2
TOTAL FM JUL 1 1132
DPTR FM NORMAL -44

CLEAR (SCALE 0-3) 10
PTCLDY (SCALE 4-7) 14
CLOUDY (SCALE 8-10) 6

[CDD (BASE 65)]

TOTAL THIS MO. 39
DPTR FM NORMAL 10
TOTAL FM JAN 1 52
DPTR FM NORMAL 5

[PRESSURE DATA]

HIGHEST SLP 30.15 ON 14
LOWEST SLP 29.82 ON 24

[REMARKS]
#FINAL-04-20#

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Climatological Report (Monthly)

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826
CXUS56 KLOX 020530
CLMLGB


CLIMATE REPORT
NATIONAL WEATHER SERVICE LOS ANGELES/OXNARD CA
1029 PM PDT FRI MAY 1 2020

.....................................

...THE LONG BEACH AIRPORT CA CLIMATE SUMMARY FOR THE MONTH OF APRIL 2020...

CLIMATE NORMAL PERIOD 1981 TO 2010
CLIMATE RECORD PERIOD 1958 TO 2020

WEATHER         OBSERVED          NORMAL  DEPART  LAST YEAR`S
                 VALUE   DATE(S)  VALUE   FROM    VALUE
                                          NORMAL
.............................................................
TEMPERATURE (F)
HIGHEST            93   04/24
LOWEST             50   04/11
                        04/10
                        04/09
AVG. MAXIMUM     69.4              71.7    -2.3
AVG. MINIMUM     55.6              53.2     2.4
MEAN             62.5              62.4     0.1
DAYS MAX >= 90      1
DAYS MAX <= 32      0
DAYS MIN <= 32      0
DAYS MIN <= 0       0

PRECIPITATION (INCHES)
TOTALS           3.03R             0.60    2.43
DAILY AVG.       0.10
DAYS >= .01         6
DAYS >= .10         5
DAYS >= .50         3
DAYS >= 1.00        0
GREATEST
 24 HR. TOTAL    0.89   04/09 TO 04/09
 STORM TOTAL      MM
 (MM/DD(HH))

DEGREE DAYS
HEATING TOTAL     104               106      -2       32
 SINCE 7/1       1132              1176     -44      922
COOLING TOTAL      39                29      10       36
 SINCE 1/1         52                47       5       48
.............................................................

WIND (MPH)
AVERAGE WIND SPEED             5.6
HIGHEST WIND SPEED/DIRECTION   18/290    DATE  04/24
```

HIGHEST GUST SPEED/DIRECTION 25/250 DATE 04/07

SKY COVER
POSSIBLE SUNSHINE (PERCENT) MM
AVERAGE SKY COVER 0.50
NUMBER OF DAYS FAIR 10
NUMBER OF DAYS PC 13
NUMBER OF DAYS CLOUDY 7

AVERAGE RH (PERCENT) 69

WEATHER CONDITIONS. NUMBER OF DAYS WITH
0
4
0
0
0
0
1
HAZE 6

- INDICATES NEGATIVE NUMBERS.
R INDICATES RECORD WAS SET OR TIED.
MM INDICATES DATA IS MISSING.
T INDICATES TRACE AMOUNT.

Explanation of the Preliminary Monthly Climate Data (F6) Product

These data are preliminary and have not undergone final quality control by the National Climatic Data Center (NCDC). Therefore, these data are subject to revision. Final and certified climate data can be accessed at the NCDC - http://www.ncdc.noaa.gov.

WFO Monthly/Daily Climate Data

```
000
CXUS56 KLOX 011655
CF6LGB
PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6)

                                        STATION:   LONG BEACH AIRPORT CA
                                        MONTH:     MAY
                                        YEAR:      2020
                                        LATITUDE:   33 49 N
                                        LONGITUDE: 118  9 W

  TEMPERATURE IN F:       :PCPN:    SNOW:  WIND      :SUNSHINE: SKY     :PK WND
=============================================================================
1   2   3   4   5  6A  6B    7    8   9   10  11  12  13   14  15   16   17  18
                                      12Z  AVG MX 2MIN
DY MAX MIN AVG DEP HDD CDD  WTR  SNW DPTH SPD SPD DIR MIN PSBL S-S WX    SPD DR
-----------------------------------------------------------------------------

 1  72  63  68   4   0   3 0.00  0.0    0  5.6 14 200   M    M   4 8      17 180
 2  78  60  69   5   0   4 0.00  0.0    0  5.2 17 310   M    M   2        20 310
 3  76  59  68   3   0   3 0.00  0.0    0  5.8 14 310   M    M   2        18 180
 4  82  56  69   4   0   4 0.00  0.0    0  4.4 13 290   M    M   1        15 290
 5  90  60  75  10   0  10 0.00  0.0    0  5.3 17 300   M    M   0        26 130
 6  93  60  77  12   0  12 0.00  0.0    0  4.0 16 300   M    M   0 1      23 320
 7  82  63  73   8   0   8 0.00  0.0    0  4.4 12 210   M    M   0        15 220
 8  74  62  68   3   0   3 0.00  0.0    0  4.9 13 150   M    M   2 128    21 170
 9  72  62  67   2   0   2 0.00  0.0    M  5.8 12 200   M    M   2 8      15 200
10  73  62  68   3   0   3 0.00  0.0    0  5.4 15 290   M    M   7 18     19 280
11  73  60  67   2   0   2 0.00  0.0    0  7.4 18 290   M    M   4        22 290
12  71  56  64  -1   1   0 0.00  0.0    0  6.3 16 220   M    M   6        21 230
13  72  57  65  -1   0   0 0.00  0.0    0  5.2 15 290   M    M   1        20 220
14  76  57  67   1   0   2 0.00  0.0    0  5.8 21 290   M    M   1        26 290
15  79  60  70   4   0   5 0.00  0.0    0  6.4 15 300   M    M   2        20 290
16  76  62  69   3   0   4 0.00  0.0    0  4.4 13 200   M    M   0        17 200
17  72  63  68   2   0   3 0.00  0.0    0  7.7 16 290   M    M   5        20 290
18  73  61  67   1   0   2 0.04  0.0    0  8.3 17 280   M    M   8 18     23 280
19  71  57  64  -2   1   0 0.00  0.0    0  7.9 20 280   M    M   1        25 280
20  75  56  66   0   0   1 0.00  0.0    0  5.8 16 290   M    M   0        22 290
21  83  58  71   5   0   6 0.00  0.0    0  6.3 21 300   M    M   0        25 300
22  71  62  67   1   0   2 0.00  0.0    0  8.5 16 150   M    M   5        20 160
23  73  62  68   2   0   3 0.00  0.0    0  7.6 15 300   M    M   4        19 300
24  78  59  69   3   0   4 0.00  0.0    0  5.8 16 300   M    M   2        20 290
25  81  60  71   5   0   6 0.00  0.0    0  5.6 13 280   M    M   2 18     17 280
26  82  60  71   5   0   6 0.00  0.0    0  5.8 14 310   M    M   2 18     18 310
27  79  59  69   3   0   4 0.00  0.0    0  6.3 15 310   M    M   4 18     19 300
28  74  61  68   2   0   3 0.00  0.0    0  5.3 14 170   M    M   8 8      18 200
29  71  61  66   0   0   1 0.00  0.0    0  5.2 13 210   M    M   9        17 210
30  79  63  71   4   0   6 0.00  0.0    0  8.6 22 290   M    M   4        28 300
31  79  60  70   3   0   5 0.00  0.0    0  6.9 21 290   M    M   0        24 290
=============================================================================
SM 2380 1861          2 117  0.04      0.0 187.9          M        88
=============================================================================
AV 76.8 60.0                                6.1 FASTST   M    M   3    MAX(MPH)
                                  MISC ----> # 22 290                # 28  300
=============================================================================
NOTES:
# LAST OF SEVERAL OCCURRENCES

COLUMN 17 PEAK WIND IN M.P.H.

PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6) , PAGE 2

                                        STATION:  LONG BEACH AIRPORT CA
                                        MONTH:    MAY
                                        YEAR:     2020
                                        LATITUDE:   33 49 N
                                        LONGITUDE: 118  9 W

[TEMPERATURE DATA]      [PRECIPITATION DATA]       SYMBOLS USED IN COLUMN 16
```

AVERAGE MONTHLY: 68.4
DPTR FM NORMAL: 2.8
HIGHEST: 93 ON 6
LOWEST: 56 ON 20,12

TOTAL FOR MONTH: 0.04
DPTR FM NORMAL: -0.17
GRTST 24HR 0.04 ON 18-18

SNOW, ICE PELLETS, HAIL
TOTAL MONTH: 0.0 INCH
GRTST 24HR 0.0
GRTST DEPTH: 0

1 = FOG OR MIST
2 = FOG REDUCING VISIBILITY TO 1/4 MILE OR LESS
3 = THUNDER
4 = ICE PELLETS
5 = HAIL
6 = FREEZING RAIN OR DRIZZLE
7 = DUSTSTORM OR SANDSTORM: VSBY 1/2 MILE OR LESS
8 = SMOKE OR HAZE
9 = BLOWING SNOW
X = TORNADO

[NO. OF DAYS WITH]

MAX 32 OR BELOW: 0
MAX 90 OR ABOVE: 2
MIN 32 OR BELOW: 0
MIN 0 OR BELOW: 0

[WEATHER - DAYS WITH]

0.01 INCH OR MORE: 1
0.10 INCH OR MORE: 0
0.50 INCH OR MORE: 0
1.00 INCH OR MORE: 0

[HDD (BASE 65)]
TOTAL THIS MO. 2
DPTR FM NORMAL -35
TOTAL FM JUL 1 1134
DPTR FM NORMAL -79

CLEAR (SCALE 0-3) 19
PTCLDY (SCALE 4-7) 11
CLOUDY (SCALE 8-10) 1

[CDD (BASE 65)]
TOTAL THIS MO. 117
DPTR FM NORMAL 61
TOTAL FM JAN 1 169
DPTR FM NORMAL 66

[PRESSURE DATA]
HIGHEST SLP 30.07 ON 20
LOWEST SLP 29.80 ON 7

[REMARKS]
#FINAL-05-20#

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Climatological Report (Monthly)

```
000
CXUS56 KLOX 100534
CLMLGB


CLIMATE REPORT
NATIONAL WEATHER SERVICE LOS ANGELES/OXNARD CA
1034 PM PDT TUE JUN 9 2020

.....

...THE LONG BEACH AIRPORT CA CLIMATE SUMMARY FOR THE MONTH OF MAY 2020...

CLIMATE NORMAL PERIOD 1981 TO 2010
CLIMATE RECORD PERIOD 1958 TO 2020

WEATHER          OBSERVED          NORMAL  DEPART  LAST YEAR'S
                  VALUE   DATE(S)  VALUE   FROM    VALUE
                                          NORMAL
.....
TEMPERATURE (F)
HIGHEST             93   05/06
LOWEST              56   05/20
                         05/12
                         05/04
AVG. MAXIMUM      76.8              73.6     3.2
AVG. MINIMUM      60.0              57.6     2.4
MEAN              68.4              65.6     2.8
DAYS MAX >= 90       2
DAYS MAX <= 32       0
DAYS MIN <= 32       0
DAYS MIN <= 0        0

PRECIPITATION (INCHES)
TOTALS            0.04              0.21   -0.17
DAILY AVG.        0.00
DAYS >= .01          1
DAYS >= .10          0
DAYS >= .50          0
DAYS >= 1.00         0
GREATEST
 24 HR. TOTAL     0.04   05/18 TO 05/18
 STORM TOTAL       MM
 (MM/DD(HH))

DEGREE_DAYS
HEATING TOTAL        2               37     -35       34
 SINCE 7/1        1134             1213     -79      956
COOLING TOTAL     117               56      61       11
 SINCE 1/1        169              103      66       59
.....

WIND (MPH)
AVERAGE WIND SPEED              6.1
HIGHEST WIND SPEED/DIRECTION    22/290    DATE  05/30
HIGHEST GUST SPEED/DIRECTION    28/300    DATE  05/30

SKY COVER
POSSIBLE SUNSHINE (PERCENT)   MM
AVERAGE SKY COVER           0.30
NUMBER OF DAYS FAIR           19
NUMBER OF DAYS PC              9
NUMBER OF DAYS CLOUDY          3

AVERAGE RH (PERCENT)     64

WEATHER CONDITIONS. NUMBER OF DAYS WITH
  0
  0
  0
  0
```

0
0
1
HAZE 9

- INDICATES NEGATIVE NUMBERS.
R INDICATES RECORD WAS SET OR TIED.
MM INDICATES DATA IS MISSING.
T INDICATES TRACE AMOUNT.

Explanation of the Preliminary Monthly Climate Data (F6) Product

These data are preliminary and have not undergone final quality control by the National Climatic Data Center (NCDC). Therefore, these data are subject to revision. Final and certified climate data can be accessed at the NCDC - http://www.ncdc.noaa.gov.

WFO Monthly/Daily Climate Data

```
000
CXUS56 KLOX 011655
CF6LGB
PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6)

                                        STATION:   LONG BEACH AIRPORT CA
                                        MONTH:     JUNE
                                        YEAR:      2020
                                        LATITUDE:   33 49 N
                                        LONGITUDE: 118  9 W

  TEMPERATURE IN F:        :PCPN:    SNOW:  WIND      :SUNSHINE: SKY     :PK WND
=============================================================================
1   2   3   4   5  6A  6B    7    8   9   10  11  12  13   14  15   16   17  18
                                     12Z  AVG MX 2MIN
DY MAX MIN AVG DEP HDD CDD  WTR  SNW DPTH SPD SPD DIR MIN PSBL S-S WX    SPD DR
=============================================================================

 1  82  61  72   5   0   7 0.00  0.0    0  8.5 22 290   M    M   0        28 290
 2  78  61  70   3   0   5 0.00  0.0    0  4.6 10 180   M    M   0        15 220
 3  88  63  76   9   0  11 0.00  0.0    0  7.4 14 160   M    M   1        20 170
 4  69  62  66  -1   0   1 0.00  0.0    0  6.9 13 160   M    M  10        19 140
 5  70  64  67   0   0   2    T  0.0    0  5.8 13 210   M    M  10        16 190
 6  72  63  68   1   0   3 0.00  0.0    0  6.1 15 300   M    M   4         M  M
 7  76  60  68   1   0   3 0.00  0.0    0  7.4 21 280   M    M   1        25 280
 8  90  59  75   7   0  10 0.00  0.0    0  7.9 22 290   M    M   0        26 280
 9  97  64  81  13   0  16 0.00  0.0    0  7.6 23 290   M    M   0        27 290
10  95  65  80  12   0  15 0.00  0.0    0  5.7 18 300   M    M   0 8      23 290
11  82  62  72   4   0   7 0.00  0.0    0  4.8 12 150   M    M   0        16 210
12  76  62  69   1   0   4 0.00  0.0    0  6.3 17 310   M    M   4        21 300
13  77  61  69   1   0   4 0.00  0.0    0  6.9 17 290   M    M   2        22 240
14  78  61  70   2   0   5 0.00  0.0    0  6.5 13 300   M    M   1        20 130
15  72  63  68   1   0   3 0.00  0.0    0  5.9 13 200   M    M   3 8      18 200
16  72  62  67  -2   0   2 0.00  0.0    0  6.0 13 190   M    M   7        18 210
17  72  61  67  -2   0   2 0.00  0.0    0  7.6 14 180   M    M   6        19 140
18  70  61  66  -3   0   1    T  0.0    0  5.0  9 190   M    M   6 18     14 170
19  75  63  69   0   0   4 0.00  0.0    0  6.9 15 290   M    M   6        23 250
20  75  62  69  -1   0   4 0.00  0.0    0  6.5 15 290   M    M   8        20 320
21  75  65  70   0   0   5 0.00  0.0    0  6.3 13 300   M    M   5        25 320
22  79  63  71   1   0   6 0.00  0.0    0  5.7 14 300   M    M   5        18 200
23  77  63  70   0   0   5 0.00  0.0    0  6.1 14 310   M    M   5 18     16 300
24  78  63  71   1   0   6 0.00  0.0    0  5.5 12 300   M    M   6 8      16 200
25  72  63  68  -2   0   3 0.00  0.0    0  5.6 12 210   M    M   5 8      16 180
26  80  63  72   1   0   7 0.00  0.0    0  6.4 13 300   M    M   4 8      16 320
27  75  63  69  -2   0   4 0.00  0.0    0  5.8 13 180   M    M   5 8      18 180
28  73  63  68  -3   0   3    T  0.0    0  6.9 13 200   M    M   9 18     16 200
29  73  63  68  -3   0   3    T  0.0    0  6.0 14 190   M    M   5        18 200
30  76  62  69  -2   0   4 0.00  0.0    0  7.1 16 290   M    M   4        22 290
=============================================================================
SM 2324 1871         0 155    T      0.0 191.7          M      122
=============================================================================
AV 77.5 62.4                                6.4 FASTST   M    M   4    MAX(MPH)
                                MISC ----->  # 23 290                # 28  290
=============================================================================
NOTES:
# LAST OF SEVERAL OCCURRENCES

COLUMN 17 PEAK WIND IN M.P.H.

PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6) , PAGE 2

                                        STATION:  LONG BEACH AIRPORT CA
                                        MONTH:    JUNE
                                        YEAR:     2020
                                        LATITUDE:   33 49 N
                                        LONGITUDE: 118  9 W

[TEMPERATURE DATA]      [PRECIPITATION DATA]       SYMBOLS USED IN COLUMN 16
```

AVERAGE MONTHLY: 69.9
DPTR FM NORMAL: 1.0
HIGHEST: 97 ON 9
LOWEST: 59 ON 8

TOTAL FOR MONTH: T
DPTR FM NORMAL: -0.07
GRTST 24HR T ON 29-29

SNOW, ICE PELLETS, HAIL
TOTAL MONTH: 0.0 INCH
GRTST 24HR 0.0
GRTST DEPTH: 0

1 = FOG OR MIST
2 = FOG REDUCING VISIBILITY TO 1/4 MILE OR LESS
3 = THUNDER
4 = ICE PELLETS
5 = HAIL
6 = FREEZING RAIN OR DRIZZLE
7 = DUSTSTORM OR SANDSTORM: VSBY 1/2 MILE OR LESS
8 = SMOKE OR HAZE
9 = BLOWING SNOW
X = TORNADO

[NO. OF DAYS WITH]

MAX 32 OR BELOW: 0
MAX 90 OR ABOVE: 3
MIN 32 OR BELOW: 0
MIN 0 OR BELOW: 0

[WEATHER - DAYS WITH]

0.01 INCH OR MORE: 0
0.10 INCH OR MORE: 0
0.50 INCH OR MORE: 0
1.00 INCH OR MORE: 0

[HDD (BASE 65)]
TOTAL THIS MO. 0
DPTR FM NORMAL -6
TOTAL FM JUL 1 1134
DPTR FM NORMAL -85

CLEAR (SCALE 0-3) 11
PTCLDY (SCALE 4-7) 16
CLOUDY (SCALE 8-10) 3

[CDD (BASE 65)]
TOTAL THIS MO. 155
DPTR FM NORMAL 34
TOTAL FM JAN 1 324
DPTR FM NORMAL 100

[PRESSURE DATA]
HIGHEST SLP M ON M
LOWEST SLP 29.72 ON 28

[REMARKS]
#FINAL-06-20#

These data are preliminary and have not undergone final quality control by the National Climatic Data Center (NCDC). Therefore, these data are subject to revision. Final and certified climate data can be accessed at the NCDC - http://www.ncdc.noaa.gov.

Climatological Report (Monthly)

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094
CXUS56 KLOX 011631
CLMLGB


CLIMATE REPORT
NATIONAL WEATHER SERVICE LOS ANGELES/OXNARD CA
931 AM PDT WED JUL 1 2020

.....

...THE LONG BEACH AIRPORT CA CLIMATE SUMMARY FOR THE MONTH OF JUNE 2020...

CLIMATE NORMAL PERIOD 1981 TO 2010
CLIMATE RECORD PERIOD 1958 TO 2020

WEATHER          OBSERVED          NORMAL  DEPART  LAST YEAR'S
                  VALUE   DATE(S)  VALUE   FROM    VALUE
                                          NORMAL
.....
TEMPERATURE (F)
HIGHEST             97   06/09
LOWEST              59   06/08
AVG. MAXIMUM      77.5              76.7     0.8
AVG. MINIMUM      62.4              61.0     1.4
MEAN              69.9              68.9     1.0
DAYS MAX >= 90       3
DAYS MAX <= 32       0
DAYS MIN <= 32       0
DAYS MIN <= 0        0

PRECIPITATION (INCHES)
TOTALS               T              0.07   -0.07
DAILY AVG.           T
DAYS >= .01          0
DAYS >= .10          0
DAYS >= .50          0
DAYS >= 1.00         0
GREATEST
 24 HR. TOTAL        T   06/29 TO 06/29
                         06/28 TO 06/28
                         06/18 TO 06/18
 STORM TOTAL        MM
 (MM/DD(HH))

DEGREE_DAYS
HEATING TOTAL        0                6      -6        2
 SINCE 7/1        1134             1219     -85      958
COOLING TOTAL      155              121      34      127
 SINCE 1/1         324              224     100      186
.....

WIND (MPH)
AVERAGE WIND SPEED              6.4
HIGHEST WIND SPEED/DIRECTION    23/290    DATE  06/09
HIGHEST GUST SPEED/DIRECTION    28/290    DATE  06/01

SKY COVER
POSSIBLE SUNSHINE (PERCENT)   MM
AVERAGE SKY COVER           0.40
NUMBER OF DAYS FAIR           11
NUMBER OF DAYS PC             15
NUMBER OF DAYS CLOUDY          4

AVERAGE RH (PERCENT)     62

WEATHER CONDITIONS. NUMBER OF DAYS WITH
  0
  0
  0
  0
```

0
0
0
HAZE 9

- INDICATES NEGATIVE NUMBERS.
R INDICATES RECORD WAS SET OR TIED.
MM INDICATES DATA IS MISSING.
T INDICATES TRACE AMOUNT.

Explanation of the Preliminary Monthly Climate Data (F6) Product

These data are preliminary and have not undergone final quality control by the National Climatic Data Center (NCDC). Therefore, these data are subject to revision. Final and certified climate data can be accessed at the NCDC - http://www.ncdc.noaa.gov.

WFO Monthly/Daily Climate Data

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146
CXUS56 KLOX 011655
CF6LGB
PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6)

                                        STATION:   LONG BEACH AIRPORT CA
                                        MONTH:     JULY
                                        YEAR:      2020
                                        LATITUDE:   33 49 N
                                        LONGITUDE: 118  9 W
```

TEMPERATURE IN F:							:PCPN:		SNOW:	WIND			:SUNSHINE:		SKY		:PK WND	
1	2	3	4	5	6A	6B	7	8	9	10	11	12	13	14	15	16	17	18
									12Z	AVG	MX	2MIN						
DY	MAX	MIN	AVG	DEP	HDD	CDD	WTR	SNW	DPTH	SPD	SPD	DIR	MIN	PSBL	S-S	WX	SPD	DR
1	73	64	69	-3	0	4	0.00	0.0	0	4.9	10	190	M	M	7		16	180
2	78	64	71	-1	0	6	0.00	0.0	0	6.9	13	280	M	M	5		16	190
3	83	61	72	0	0	7	0.00	0.0	0	7.0	14	290	M	M	0		17	300
4	87	63	75	3	0	10	0.00	0.0	0	5.4	16	310	M	M	0	8	19	290
5	88	64	76	4	0	11	0.00	0.0	0	4.7	13	300	M	M	0	1	15	320
6	85	64	75	3	0	10	0.00	0.0	0	5.5	10	310	M	M	2	18	15	160
7	81	66	74	2	0	9	0.00	0.0	0	5.3	13	190	M	M	2	8	17	180
8	75	66	71	-2	0	6	0.00	0.0	0	6.6	12	170	M	M	3		18	210
9	84	66	75	2	0	10	0.00	0.0	0	5.8	14	210	M	M	3	8	19	200
10	89	65	77	4	0	12	0.00	0.0	0	5.4	12	310	M	M	3	18	15	270
11	94	65	80	7	0	15	0.00	0.0	0	5.9	16	290	M	M	0		19	310
12	92	68	80	7	0	15	0.00	0.0	0	5.1	15	310	M	M	0		17	310
13	79	67	73	0	0	8	0.00	0.0	0	6.9	13	290	M	M	3		16	190
14	80	65	73	0	0	8	0.00	0.0	0	6.2	14	290	M	M	5		16	300
15	80	64	72	-1	0	7	0.00	0.0	0	7.0	15	300	M	M	4		20	300
16	80	63	72	-1	0	7	0.00	0.0	0	6.9	14	310	M	M	3		17	260
17	81	65	73	-1	0	8	0.00	0.0	0	7.0	16	300	M	M	4		22	280
18	82	63	73	-1	0	8	0.00	0.0	0	6.9	15	290	M	M	0		21	290
19	81	62	72	-2	0	7	0.00	0.0	0	6.6	16	290	M	M	1		21	340
20	80	62	71	-3	0	6	0.00	0.0	0	6.3	14	290	M	M	1		16	180
21	78	63	71	-3	0	6	0.00	0.0	0	5.9	17	300	M	M	1		19	300
22	76	61	69	-5	0	4	0.00	0.0	0	4.9	12	290	M	M	6	1	20	230
23	73	63	68	-6	0	3	0.00	0.0	0	5.7	12	300	M	M	6		15	180
24	76	62	69	-5	0	4	0.00	0.0	0	6.0	13	280	M	M	5		17	210
25	80	63	72	-2	0	7	0.00	0.0	0	6.2	14	290	M	M	4		18	310
26	81	61	71	-3	0	6	0.00	0.0	0	6.0	16	310	M	M	2	18	19	280
27	79	62	71	-3	0	6	0.00	0.0	0	5.9	14	300	M	M	0		17	300
28	80	61	71	-3	0	6	0.00	0.0	0	5.7	12	310	M	M	3	18	17	300
29	81	61	71	-3	0	6	0.00	0.0	0	5.5	14	300	M	M	1	1	18	300
30	85	60	73	-1	0	8	0.00	0.0	0	6.4	16	290	M	M	4	18	20	280
31	90	64	77	3	0	12	0.00	0.0	0	5.8	16	310	M	M	0		19	290
SM	2531	1968			0	242	0.00		0.0	186.3			M		78			
AV	81.7	63.5								6.0	FASTST		M	M	3		MAX(MPH)	

MISC ----> # 17 300 # 22 280

NOTES:
LAST OF SEVERAL OCCURRENCES

COLUMN 17 PEAK WIND IN M.P.H.

PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6) , PAGE 2

STATION: LONG BEACH AIRPORT CA
MONTH: JULY
YEAR: 2020
LATITUDE: 33 49 N
LONGITUDE: 118 9 W

[TEMPERATURE DATA]

AVERAGE MONTHLY: 72.6
DPTR FM NORMAL: -0.6
HIGHEST: 94 ON 11
LOWEST: 60 ON 30

[PRECIPITATION DATA]

TOTAL FOR MONTH: 0.00
DPTR FM NORMAL: -0.03
GRTST 24HR 0.00 ON 31-31

SNOW, ICE PELLETS, HAIL
TOTAL MONTH: 0.0 INCH
GRTST 24HR 0.0
GRTST DEPTH: 0

SYMBOLS USED IN COLUMN 16

1 = FOG OR MIST
2 = FOG REDUCING VISIBILITY TO 1/4 MILE OR LESS
3 = THUNDER
4 = ICE PELLETS
5 = HAIL
6 = FREEZING RAIN OR DRIZZLE
7 = DUSTSTORM OR SANDSTORM: VSBY 1/2 MILE OR LESS
8 = SMOKE OR HAZE
9 = BLOWING SNOW
X = TORNADO

[NO. OF DAYS WITH]

MAX 32 OR BELOW: 0
MAX 90 OR ABOVE: 3
MIN 32 OR BELOW: 0
MIN 0 OR BELOW: 0

[WEATHER - DAYS WITH]

0.01 INCH OR MORE: 0
0.10 INCH OR MORE: 0
0.50 INCH OR MORE: 0
1.00 INCH OR MORE: 0

[HDD (BASE 65)]
TOTAL THIS MO. 0
DPTR FM NORMAL 0
TOTAL FM JUL 1 0
DPTR FM NORMAL 0

CLEAR (SCALE 0-3) 21
PTCLDY (SCALE 4-7) 10
CLOUDY (SCALE 8-10) 0

[CDD (BASE 65)]
TOTAL THIS MO. 242
DPTR FM NORMAL -12
TOTAL FM JAN 1 566
DPTR FM NORMAL 88

[PRESSURE DATA]
HIGHEST SLP M ON M
LOWEST SLP 29.75 ON 21

[REMARKS]
#FINAL-07-20#

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Climatological Report (Monthly)

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555
CXUS56 KLOX 040445
CLMLGB


CLIMATE REPORT
NATIONAL WEATHER SERVICE LOS ANGELES/OXNARD CA
945 PM PDT MON AUG 3 2020

.....................................

...THE LONG BEACH AIRPORT CA CLIMATE SUMMARY FOR THE MONTH OF JULY 2020...

CLIMATE NORMAL PERIOD 1981 TO 2010
CLIMATE RECORD PERIOD 1958 TO 2020

WEATHER         OBSERVED          NORMAL  DEPART  LAST YEAR`S
                 VALUE   DATE(S)  VALUE   FROM    VALUE
                                          NORMAL
.....................................................................
TEMPERATURE (F)
HIGHEST            94   07/11
LOWEST             60   07/30
AVG. MAXIMUM     81.6              81.9    -0.3
AVG. MINIMUM     63.5              64.5    -1.0
MEAN             72.6              73.2    -0.6
DAYS MAX >= 90      3
DAYS MAX <= 32      0
DAYS MIN <= 32      0
DAYS MIN <= 0       0

PRECIPITATION (INCHES)
TOTALS           0.00              0.03   -0.03
DAILY AVG.       0.00
DAYS >= .01         0
DAYS >= .10         0
DAYS >= .50         0
DAYS >= 1.00        0
GREATEST
 24 HR. TOTAL    0.00   07/31 TO 07/31
                        07/30 TO 07/30
                        07/29 TO 07/29
 STORM TOTAL       MM
 (MM/DD(HH))

DEGREE_DAYS
HEATING TOTAL       0                 0       0       0
 SINCE 7/1          0                 0       0       0
COOLING TOTAL     242               254     -12     303
 SINCE 1/1        566               478      88     489
.....................................................................

WIND (MPH)
AVERAGE WIND SPEED             6.0
HIGHEST WIND SPEED/DIRECTION   17/300    DATE  07/21
```

```
HIGHEST GUST SPEED/DIRECTION    22/280    DATE  07/17

SKY COVER
POSSIBLE SUNSHINE (PERCENT)   MM
AVERAGE SKY COVER           0.20
NUMBER OF DAYS FAIR           21
NUMBER OF DAYS PC             10
NUMBER OF DAYS CLOUDY          0

AVERAGE RH (PERCENT)     67

WEATHER CONDITIONS. NUMBER OF DAYS WITH
  0
  0
  0
  0
  0
  0
  0
HAZE                      8

-  INDICATES NEGATIVE NUMBERS.
R  INDICATES RECORD WAS SET OR TIED.
MM INDICATES DATA IS MISSING.
T  INDICATES TRACE AMOUNT.
```

[Explanation of the Preliminary Monthly Climate Data (F6) Product]

These data are preliminary and have not undergone final quality control by the National Climatic Data Center (NCDC). Therefore, these data are subject to revision. Final and certified climate data can be accessed at the NCDC - http://www.ncdc.noaa.gov.

WFO Monthly/Daily Climate Data

506
CXUS56 KLOX 011655
CF6LGB
PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6)

STATION: LONG BEACH AIRPORT CA
MONTH: AUGUST
YEAR: 2020
LATITUDE: 33 49 N
LONGITUDE: 118 9 W

	TEMPERATURE IN F:							:PCPN:	SNOW:	WIND			:SUNSHINE:		SKY		:PK WND	
1	2	3	4	5	6A	6B	7	8	9	10	11	12	13	14	15	16	17	18
									12Z	AVG	MX	2MIN						
DY	MAX	MIN	AVG	DEP	HDD	CDD	WTR	SNW	DPTH	SPD	SPD	DIR	MIN	PSBL	S-S	WX	SPD	DR
1	78	63	71	-3	0	6	0.00	0.0	0	4.9	15	150	M	M	1	18	19	150
2	75	62	69	-5	0	4	0.00	0.0	0	4.9	12	200	M	M	5	128	16	150
3	76	65	71	-3	0	6	0.00	0.0	0	5.4	13	190	M	M	4	18	16	190
4	75	65	70	-4	0	5	0.00	0.0	0	5.4	12	180	M	M	6	1	16	180
5	77	64	71	-3	0	6	0.00	0.0	0	5.1	13	290	M	M	5		16	240
6	76	64	70	-4	0	5	0.00	0.0	0	5.7	12	300	M	M	5		16	230
7	81	62	72	-2	0	7	0.00	0.0	0	5.8	14	290	M	M	0	1	17	290
8	82	63	73	-1	0	8	0.00	0.0	0	5.8	14	290	M	M	0	18	15	280
9	81	62	72	-2	0	7	0.00	0.0	0	6.8	13	290	M	M	0		16	310
10	82	62	72	-2	0	7	0.00	0.0	0	6.2	15	320	M	M	2	18	19	290
11	78	61	70	-4	0	5	0.00	0.0	0	6.3	16	320	M	M	0		21	310
12	86	61	74	0	0	9	0.00	0.0	0	5.0	15	290	M	M	0	18	18	280
13	93	69	81	7	0	16	0.00	0.0	0	4.8	14	300	M	M	0		21	310
14	96	69	83	9	0	18	0.00	0.0	0	5.7	16	290	M	M	0		19	290
15	90	71	81	7	0	16	0.00	0.0	0	5.5	13	150	M	M	1		16	150
16	86	70	78	4	0	13	0.00	0.0	0	5.7	14	160	M	M	2		19	160
17	89	70	80	6	0	15	0.00	0.0	0	4.6	14	310	M	M	0		16	300
18	100	70	85	11	0	20	0.00	0.0	0	4.9	17	180	M	M	3	18	22	190
19	94	73	84	10	0	19	0.00	0.0	0	6.3	15	310	M	M	0		19	310
20	93	73	83	9	0	18	0.00	0.0	0	5.1	14	180	M	M	3		20	150
21	86	72	79	5	0	14	0.00	0.0	0	4.6	14	180	M	M	1	8	17	180
22	90	73	82	8	0	17	0.00	0.0	0	5.2	14	190	M	M	1	8	19	180
23	91	73	82	8	0	17	0.00	0.0	0	6.3	16	310	M	M	3		20	300
24	84	71	78	4	0	13	0.00	0.0	0	8.6	16	300	M	M	4	18	19	290
25	87	70	79	5	0	14	0.00	0.0	0	7.0	17	300	M	M	2	18	M	M
26	89	67	78	4	0	13	0.00	0.0	0	6.1	14	310	M	M	0	1	17	290
27	91	68	80	6	0	15	0.00	0.0	0	5.7	15	300	M	M	0	8	19	300
28	85	64	75	1	0	10	0.00	0.0	0	6.2	14	300	M	M	0		19	280
29	82	64	73	-1	0	8	0.00	0.0	0	5.9	16	300	M	M	3	18	18	310
30	80	65	73	-1	0	8	0.00	0.0	0	6.2	14	290	M	M	4		18	290
31	80	65	73	-1	0	8	0.00	0.0	0	6.5	14	300	M	M	3	8	24	300
SM	2633	2071			0	347	0.00		0.0	178.2			M		58			
AV	84.9	66.8								5.7	FASTST		M	M	2		MAX(MPH)	

MISC ----> # 17 180 # 24 300

NOTES:
LAST OF SEVERAL OCCURRENCES

COLUMN 17 PEAK WIND IN M.P.H.

PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6) , PAGE 2

STATION: LONG BEACH AIRPORT CA
MONTH: AUGUST
YEAR: 2020
LATITUDE: 33 49 N
LONGITUDE: 118 9 W

[TEMPERATURE DATA]

AVERAGE MONTHLY: 75.9
DPTR FM NORMAL: 1.6
HIGHEST: 100 ON 18
LOWEST: 61 ON 12,11

[PRECIPITATION DATA]

TOTAL FOR MONTH: 0.00
DPTR FM NORMAL: -0.03
GRTST 24HR 0.00 ON 31-31

SNOW, ICE PELLETS, HAIL
TOTAL MONTH: 0.0 INCH
GRTST 24HR 0.0
GRTST DEPTH: 0

SYMBOLS USED IN COLUMN 16

1 = FOG OR MIST
2 = FOG REDUCING VISIBILITY TO 1/4 MILE OR LESS
3 = THUNDER
4 = ICE PELLETS
5 = HAIL
6 = FREEZING RAIN OR DRIZZLE
7 = DUSTSTORM OR SANDSTORM: VSBY 1/2 MILE OR LESS
8 = SMOKE OR HAZE
9 = BLOWING SNOW
X = TORNADO

[NO. OF DAYS WITH]

MAX 32 OR BELOW: 0
MAX 90 OR ABOVE: 9
MIN 32 OR BELOW: 0
MIN 0 OR BELOW: 0

[WEATHER - DAYS WITH]

0.01 INCH OR MORE: 0
0.10 INCH OR MORE: 0
0.50 INCH OR MORE: 0
1.00 INCH OR MORE: 0

[HDD (BASE 65)]
TOTAL THIS MO. 0
DPTR FM NORMAL 0
TOTAL FM JUL 1 0
DPTR FM NORMAL 0

CLEAR (SCALE 0-3) 22
PTCLDY (SCALE 4-7) 9
CLOUDY (SCALE 8-10) 0

[CDD (BASE 65)]
TOTAL THIS MO. 347
DPTR FM NORMAL 57
TOTAL FM JAN 1 913
DPTR FM NORMAL 145

[PRESSURE DATA]
HIGHEST SLP M ON M
LOWEST SLP 29.64 ON 20

[REMARKS]
#FINAL-08-20#

These data are preliminary and have not undergone final quality control by the National Climatic Data Center (NCDC). Therefore, these data are subject to revision. Final and certified climate data can be accessed at the NCDC - http://www.ncdc.noaa.gov.

Climatological Report (Monthly)

```
000
CXUS56 KLOX 011931
CLMLGB


CLIMATE REPORT
NATIONAL WEATHER SERVICE LOS ANGELES/OXNARD CA
1231 PM PDT TUE SEP 1 2020

.....................................

...THE LONG BEACH AIRPORT CA CLIMATE SUMMARY FOR THE MONTH OF AUGUST 2020...

CLIMATE NORMAL PERIOD 1981 TO 2010
CLIMATE RECORD PERIOD 1958 TO 2020

WEATHER         OBSERVED          NORMAL  DEPART  LAST YEAR`S
                 VALUE   DATE(S)  VALUE   FROM    VALUE
                                          NORMAL
.............................................................
TEMPERATURE (F)
HIGHEST           100   08/18
LOWEST             61   08/12
                       08/11
AVG. MAXIMUM     84.9              83.8     1.1
AVG. MINIMUM     66.8              64.9     1.9
MEAN             75.9              74.3     1.6
DAYS MAX >= 90      9
DAYS MAX <= 32      0
DAYS MIN <= 32      0
DAYS MIN <= 0       0

PRECIPITATION (INCHES)
TOTALS           0.00              0.03   -0.03
DAILY AVG.       0.00
DAYS >= .01         0
DAYS >= .10         0
DAYS >= .50         0
DAYS >= 1.00        0
GREATEST
 24 HR. TOTAL    0.00   08/31 TO 08/31
                        08/30 TO 08/30
                        08/29 TO 08/29
 STORM TOTAL       MM
 (MM/DD(HH))

DEGREE_DAYS
HEATING TOTAL       0                 0       0       0
 SINCE 7/1          0                 0       0       0
COOLING TOTAL     347               290      57     353
 SINCE 1/1        913               768     145     842
.............................................................

WIND (MPH)
AVERAGE WIND SPEED              5.7
```

```
HIGHEST WIND SPEED/DIRECTION    17/300    DATE  08/25
HIGHEST GUST SPEED/DIRECTION    24/300    DATE  08/31

SKY COVER
POSSIBLE SUNSHINE (PERCENT)   MM
AVERAGE SKY COVER           0.20
NUMBER OF DAYS FAIR           24
NUMBER OF DAYS PC              7
NUMBER OF DAYS CLOUDY          0

AVERAGE RH (PERCENT)     68

WEATHER CONDITIONS. NUMBER OF DAYS WITH
  0
  0
  0
  0
  0
  0
  1
HAZE                      14

-  INDICATES NEGATIVE NUMBERS.
R  INDICATES RECORD WAS SET OR TIED.
MM INDICATES DATA IS MISSING.
T  INDICATES TRACE AMOUNT.
```

[Explanation of the Preliminary Monthly Climate Data (F6) Product]

These data are preliminary and have not undergone final quality control by the National Climatic Data Center (NCDC). Therefore, these data are subject to revision. Final and certified climate data can be accessed at the NCDC - http://www.ncdc.noaa.gov.

WFO Monthly/Daily Climate Data

```
000
CXUS56 KLOX 011655
CF6LGB
PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6)

                                        STATION:   LONG BEACH AIRPORT CA
                                        MONTH:     SEPTEMBER
                                        YEAR:      2020
                                        LATITUDE:   33 49 N
                                        LONGITUDE: 118  9 W
```

	TEMPERATURE IN F:							PCPN:	SNOW:	WIND				SUNSHINE:		SKY		PK WND	
1	2	3	4	5	6A	6B	7	8	9	10	11	12	13	14	15	16	17	18
									12Z	AVG	MX	2MIN						
DY	MAX	MIN	AVG	DEP	HDD	CDD	WTR	SNW	DPTH	SPD	SPD	DIR	MIN	PSBL	S-S	WX	SPD	DR
1	79	65	72	-2	0	7	0.00	0.0	0	6.8	15	310	M	M	4		18	190
2	80	64	72	-2	0	7	0.00	0.0	0	6.2	16	290	M	M	1		19	310
3	82	64	73	-1	0	8	0.00	0.0	0	4.8	14	310	M	M	1	18	17	320
4	89	65	77	3	0	12	0.00	0.0	0	4.4	15	310	M	M	0	18	17	310
5	102	69	86	12	0	21	0.00	0.0	0	6.0	21	290	M	M	0	8	25	280
6	104	73	89	15	0	24	0.00	0.0	0	4.3	12	150	M	M	0		17	170
7	77	71	74	0	0	9	0.00	0.0	0	6.5	14	160	M	M	5	1	20	190
8	76	70	73	-1	0	8	0.00	0.0	0	5.0	10	190	M	M	8		14	160
9	87	66	77	3	0	12	0.00	0.0	0	3.9	15	290	M	M	2	18	18	290
10	82	61	72	-2	0	7	0.00	0.0	0	4.1	13	290	M	M	3	128	15	290
11	87	60	74	1	0	9	0.00	0.0	0	3.3	15	300	M	M	0	18	17	300
12	85	60	73	0	0	8	0.00	0.0	0	3.9	14	310	M	M	0	18	15	310
13	84	61	73	0	0	8	0.00	0.0	0	3.7	14	290	M	M	2	18	18	270
14	86	60	73	0	0	8	0.00	0.0	0	3.6	14	310	M	M	0	18	16	310
15	90	61	76	3	0	11	0.00	0.0	0	3.9	14	310	M	M	0	18	16	320
16	95	61	78	5	0	13	0.00	0.0	0	3.7	17	300	M	M	0	8	21	300
17	95	62	79	6	0	14	0.00	0.0	0	3.5	16	300	M	M	0	8	19	310
18	92	65	79	7	0	14	0.00	0.0	0	5.5	17	290	M	M	0		21	290
19	86	65	76	4	0	11	0.00	0.0	0	3.8	10	300	M	M	0		13	150
20	77	62	70	-2	0	5	0.00	0.0	0	4.0	10	210	M	M	2	18	14	220
21	81	64	73	1	0	8	0.00	0.0	0	4.8	14	290	M	M	4	8	16	280
22	84	65	75	3	0	10	0.00	0.0	0	5.2	14	290	M	M	3	18	16	290
23	86	64	75	3	0	10	0.00	0.0	0	5.2	14	280	M	M	0	18	17	290
24	81	62	72	0	0	7	0.00	0.0	0	4.4	10	200	M	M	1	18	13	210
25	77	65	71	0	0	6	0.00	0.0	0	4.8	12	200	M	M	4	18	16	200
26	76	65	71	0	0	6	0.00	0.0	0	5.0	10	170	M	M	4		14	210
27	75	67	71	0	0	6	0.00	0.0	0	4.4	12	180	M	M	6		15	190
28	88	66	77	6	0	12	0.00	0.0	0	4.6	13	310	M	M	1	18	14	290
29	92	64	78	7	0	13	0.00	0.0	0	6.0	16	320	M	M	3	18	22	260
30	105	66	86	16	0	21	0.00	0.0	0	4.9	20	290	M	M	0		23	300
SM	2580	1933			0	315	0.00		0.0	140.2			M		54			
AV	86.0	64.4								4.7	FASTST		M	M	2		MAX(MPH)	
								MISC ---->		# 21	290					# 25	280	

NOTES:
LAST OF SEVERAL OCCURRENCES

COLUMN 17 PEAK WIND IN M.P.H.

PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6) , PAGE 2

STATION: LONG BEACH AIRPORT CA
MONTH: SEPTEMBER
YEAR: 2020
LATITUDE: 33 49 N
LONGITUDE: 118 9 W

[TEMPERATURE DATA]

AVERAGE MONTHLY: 75.2
DPTR FM NORMAL: 2.5
HIGHEST: 105 ON 30
LOWEST: 60 ON 14,12

[PRECIPITATION DATA]

TOTAL FOR MONTH: 0.00
DPTR FM NORMAL: -0.18
GRTST 24HR 0.00 ON 30-30

SNOW, ICE PELLETS, HAIL
TOTAL MONTH: 0.0 INCH
GRTST 24HR 0.0
GRTST DEPTH: 0

SYMBOLS USED IN COLUMN 16

1 = FOG OR MIST
2 = FOG REDUCING VISIBILITY TO 1/4 MILE OR LESS
3 = THUNDER
4 = ICE PELLETS
5 = HAIL
6 = FREEZING RAIN OR DRIZZLE
7 = DUSTSTORM OR SANDSTORM: VSBY 1/2 MILE OR LESS
8 = SMOKE OR HAZE
9 = BLOWING SNOW
X = TORNADO

[NO. OF DAYS WITH]

MAX 32 OR BELOW: 0
MAX 90 OR ABOVE: 8
MIN 32 OR BELOW: 0
MIN 0 OR BELOW: 0

[WEATHER - DAYS WITH]

0.01 INCH OR MORE: 0
0.10 INCH OR MORE: 0
0.50 INCH OR MORE: 0
1.00 INCH OR MORE: 0

[HDD (BASE 65)]

TOTAL THIS MO. 0
DPTR FM NORMAL -1
TOTAL FM JUL 1 0
DPTR FM NORMAL -1

CLEAR (SCALE 0-3) 22
PTCLDY (SCALE 4-7) 8
CLOUDY (SCALE 8-10) 0

[CDD (BASE 65)]

TOTAL THIS MO. 315
DPTR FM NORMAL 84
TOTAL FM JAN 1 1228
DPTR FM NORMAL 229

[PRESSURE DATA]

HIGHEST SLP 30.05 ON 15
LOWEST SLP 29.65 ON 8

[REMARKS]
#FINAL-09-20#

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Climatological Report (Monthly)

```
000
CXUS56 KLOX 191234
CLMLGB


CLIMATE REPORT
NATIONAL WEATHER SERVICE LOS ANGELES/OXNARD CA
534 AM PDT MON OCT 19 2020

.....................................

...THE LONG BEACH AIRPORT CA CLIMATE SUMMARY FOR THE MONTH OF SEPTEMBER 2020...

CLIMATE NORMAL PERIOD 1981 TO 2010
CLIMATE RECORD PERIOD 1958 TO 2020
```

WEATHER	OBSERVED VALUE	DATE(S)	NORMAL VALUE	DEPART FROM NORMAL	LAST YEAR`S VALUE
TEMPERATURE (F)					
HIGHEST	105	09/30			
LOWEST	60	09/14			
		09/12			
		09/11			
AVG. MAXIMUM	86.0		82.1	3.9	
AVG. MINIMUM	64.4		63.2	1.2	
MEAN	75.2		72.7	2.5	
DAYS MAX >= 90	8				
DAYS MAX <= 32	0				
DAYS MIN <- 32	0				
DAYS MIN <= 0	0				
PRECIPITATION (INCHES)					
TOTALS	0.00		0.18	-0.18	
DAILY AVG.	0.00				
DAYS >= .01	0				
DAYS >= .10	0				
DAYS >= .50	0				
DAYS >= 1.00	0				
GREATEST					
24 HR. TOTAL	0.00	09/30 TO 09/30			
		09/29 TO 09/29			
		09/28 TO 09/28			
STORM TOTAL (MM/DD(HH))	MM				
DEGREE_DAYS					
HEATING TOTAL	0		1	-1	0
SINCE 7/1	0		1	-1	0
COOLING TOTAL	315		231	84	336
SINCE 1/1	1228		999	229	1178

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.....................................................

WIND (MPH)
```

```
AVERAGE WIND SPEED              4.7
HIGHEST WIND SPEED/DIRECTION    21/290    DATE  09/05
HIGHEST GUST SPEED/DIRECTION    25/280    DATE  09/05

SKY COVER
POSSIBLE SUNSHINE (PERCENT)   MM
AVERAGE SKY COVER           0.20
NUMBER OF DAYS FAIR           23
NUMBER OF DAYS PC              6
NUMBER OF DAYS CLOUDY          1

AVERAGE RH (PERCENT)     65

WEATHER CONDITIONS. NUMBER OF DAYS WITH
  0
  0
  0
  0
  0
  0
  1
HAZE                     20

-  INDICATES NEGATIVE NUMBERS.
R  INDICATES RECORD WAS SET OR TIED.
MM INDICATES DATA IS MISSING.
T  INDICATES TRACE AMOUNT.
```

[Explanation of the Preliminary Monthly Climate Data (F6) Product]

These data are preliminary and have not undergone final quality control by the National Climatic Data Center (NCDC). Therefore, these data are subject to revision. Final and certified climate data can be accessed at the NCDC - http://www.ncdc.noaa.gov.

WFO Monthly/Daily Climate Data

```
000
CXUS56 KLOX 020653
CF6LGB
PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6)

                                        STATION:   LONG BEACH AIRPORT CA
                                        MONTH:     OCTOBER
                                        YEAR:      2020
                                        LATITUDE:   33 49 N
                                        LONGITUDE: 118  9 W

  TEMPERATURE IN F:       :PCPN:    SNOW:  WIND      :SUNSHINE: SKY     :PK WND
=============================================================================
1   2   3   4   5  6A  6B    7    8   9   10  11  12  13   14  15   16   17  18
                                      12Z  AVG MX 2MIN
DY MAX MIN AVG DEP HDD CDD  WTR  SNW DPTH SPD SPD DIR MIN PSBL S-S WX    SPD DR
=============================================================================

 1  96  65  81  11   0  16 0.00  0.0    0  3.3 13 300   M    M   0 18     14 300
 2  91  67  79   9   0  14 0.00  0.0    0  2.7 10 200   M    M   0 1      14 210
 3  87  64  76   6   0  11 0.00  0.0    0  3.5 10 190   M    M   2 128    13 180
 4  92  64  78   8   0  13 0.00  0.0    0  2.3  9 290   M    M   3 128    11 180
 5  91  66  79   9   0  14 0.00  0.0    0  4.3 13 320   M    M   0 18     16 310
 6  87  64  76   7   0  11 0.00  0.0    0  4.5 12 300   M    M   0 18     14 180
 7  75  63  69   0   0   4 0.00  0.0    0  4.4 12 200   M    M   4 128    15 200
 8  76  66  71   2   0   6 0.00  0.0    0  5.3 13 280   M    M   5        17 180
 9  75  66  71   2   0   6 0.00  0.0    0  4.6 14 290   M    M   8 8      16 290
10  75  65  70   1   0   5 0.00  0.0    0  4.8 14 300   M    M   6        19 290
11  77  61  69   0   0   4 0.00  0.0    0  4.0 14 300   M    M   2        15 300
12  92  62  77   9   0  12 0.00  0.0    0  4.4 16 310   M    M   0 18     18 320
13  94  63  79  11   0  14 0.00  0.0    0  4.4 13 320   M    M   1 1      15 320
14  87  62  75   7   0  10 0.00  0.0    0  3.0  9 200   M    M   0 1      12 200
15  95  64  80  12   0  15 0.00  0.0    0  3.6 13 310   M    M   2 128    15 320
16  87  64  76   8   0  11 0.00  0.0    0  3.8 12 310   M    M   3 128    14 310
17  80  65  73   5   0   8 0.00  0.0    0  4.4 10 180   M    M   4 128    13 200
18  81  66  74   6   0   9 0.00  0.0    0  4.0 12 290   M    M   4 18     15 290
19  79  64  72   5   0   7 0.00  0.0    0  4.6 13 300   M    M   3 18     15 310
20  76  65  71   4   0   6 0.00  0.0    0  4.5 13 290   M    M   5 18     16 300
21  74  65  70   3   0   5 0.00  0.0    0  3.9 10 200   M    M   8 18     14 200
22  74  66  70   3   0   5 0.00  0.0    0  3.2 10 190   M    M   7        13 170
23  72  65  69   2   0   4 0.00  0.0    0  3.9 12 290   M    M   8        14 300
24  71  65  68   2   0   3 0.00  0.0    0  5.1 14 300   M    M  10         M  M
25  68  59  64  -2   1   0 0.03  0.0    0  5.8 16 290   M    M   8 1      19 290
26  73  53  63  -3   2   0 0.00  0.0    0  5.0 22  70   M    M   9 8      27  70
27  80  50  65  -1   0   0 0.00  0.0    0  4.4 18 290   M    M   6 8      21 290
28  75  53  64  -2   1   0 0.00  0.0    M  3.8 13 290   M    M   0 8      15 300
29  81  51  66   0   0   1 0.00  0.0    0  2.2 12 310   M    M   0 8      13 310
30  79  56  68   3   0   3 0.00  0.0    0  3.5 12 320   M    M   3 128    15 190
31  78  53  66   1   0   1 0.00  0.0    0  2.7  9 140   M    M   4 128    12 120
=============================================================================
SM 2518 1922         4 218  0.03     0.0 123.9          M      115
=============================================================================
AV 81.2 62.0                                4.0 FASTST   M    M   4    MAX(MPH)
```

MISC ----> # 22 70 # 27 70

NOTES:
LAST OF SEVERAL OCCURRENCES

COLUMN 17 PEAK WIND IN M.P.H.

PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6) , PAGE 2

STATION: LONG BEACH AIRPORT CA
MONTH: OCTOBER
YEAR: 2020
LATITUDE: 33 49 N
LONGITUDE: 118 9 W

[TEMPERATURE DATA]

AVERAGE MONTHLY: 71.6
DPTR FM NORMAL: 3.9
HIGHEST: 96 ON 1
LOWEST: 50 ON 27

[PRECIPITATION DATA]

TOTAL FOR MONTH: 0.03
DPTR FM NORMAL: -0.60
GRTST 24HR 0.03 ON 25-25

SNOW, ICE PELLETS, HAIL
TOTAL MONTH: 0.0 INCH
GRTST 24HR 0.0
GRTST DEPTH: 0

SYMBOLS USED IN COLUMN 16

1 = FOG OR MIST
2 = FOG REDUCING VISIBILITY TO 1/4 MILE OR LESS
3 = THUNDER
4 = ICE PELLETS
5 = HAIL
6 = FREEZING RAIN OR DRIZZLE
7 = DUSTSTORM OR SANDSTORM: VSBY 1/2 MILE OR LESS
8 = SMOKE OR HAZE
9 = BLOWING SNOW
X = TORNADO

[NO. OF DAYS WITH]

MAX 32 OR BELOW: 0
MAX 90 OR ABOVE: 7
MIN 32 OR BELOW: 0
MIN 0 OR BELOW: 0

[WEATHER - DAYS WITH]

0.01 INCH OR MORE: 1
0.10 INCH OR MORE: 0
0.50 INCH OR MORE: 0
1.00 INCH OR MORE: 0

[HDD (BASE 65)]

TOTAL THIS MO. 4
DPTR FM NORMAL -16
TOTAL FM JUL 1 4
DPTR FM NORMAL -17

CLEAR (SCALE 0-3) 15
PTCLDY (SCALE 4-7) 13
CLOUDY (SCALE 8-10) 3

[CDD (BASE 65)]

TOTAL THIS MO. 218
DPTR FM NORMAL 113
TOTAL FM JAN 1 1446
DPTR FM NORMAL 342

[PRESSURE DATA]

HIGHEST SLP 30.10 ON 28
LOWEST SLP 29.78 ON 2

[REMARKS]
#FINAL-10-20#

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Climatological Report (Monthly)

```
000
CXUS56 KLOX 020655
CLMLGB


CLIMATE REPORT
NATIONAL WEATHER SERVICE LOS ANGELES/OXNARD CA
1055 PM PST SUN NOV 1 2020

.....................................

...THE LONG BEACH AIRPORT CA CLIMATE SUMMARY FOR THE MONTH OF OCTOBER 2020...

CLIMATE NORMAL PERIOD 1981 TO 2010
CLIMATE RECORD PERIOD 1958 TO 2020
```

WEATHER	OBSERVED VALUE	DATE(S)	NORMAL VALUE	DEPART FROM NORMAL	LAST YEAR`S VALUE
TEMPERATURE (F)					
HIGHEST	96	10/01			
LOWEST	50	10/27			
AVG. MAXIMUM	81.2		77.2	4.0	
AVG. MINIMUM	62.0		58.3	3.7	
MEAN	71.6		67.7	3.9	
DAYS MAX >= 90	7				
DAYS MAX <= 32	0				
DAYS MIN <= 32	0				
DAYS MIN <= 0	0				
PRECIPITATION (INCHES)					
TOTALS	0.03		0.63	-0.60	
DAILY AVG.	0.00				
DAYS >= .01	1				
DAYS >= .10	0				
DAYS >= .50	0				
DAYS >= 1.00	0				
GREATEST					
24 HR. TOTAL	0.03	10/25 TO 10/25			
STORM TOTAL	MM				
(MM/DD(HH))					
DEGREE_DAYS					
HEATING TOTAL	4		20	-16	3
SINCE 7/1	4		21	-17	3
COOLING TOTAL	218		105	113	200
SINCE 1/1	1446		1104	342	1378

```
.....................................

WIND (MPH)
AVERAGE WIND SPEED              4.0
HIGHEST WIND SPEED/DIRECTION    22/070    DATE  10/26
HIGHEST GUST SPEED/DIRECTION    27/070    DATE  10/26
```

```
SKY COVER
POSSIBLE SUNSHINE (PERCENT)   MM
AVERAGE SKY COVER            0.40
NUMBER OF DAYS FAIR            16
NUMBER OF DAYS PC               9
NUMBER OF DAYS CLOUDY           6

AVERAGE RH (PERCENT)      65

WEATHER CONDITIONS. NUMBER OF DAYS WITH
  0
  0
  0
  0
  0
  0
  8
HAZE                      21

-  INDICATES NEGATIVE NUMBERS.
R  INDICATES RECORD WAS SET OR TIED.
MM INDICATES DATA IS MISSING.
T  INDICATES TRACE AMOUNT.
```

Explanation of the Preliminary Monthly Climate Data (F6) Product

These data are preliminary and have not undergone final quality control by the National Climatic Data Center (NCDC). Therefore, these data are subject to revision. Final and certified climate data can be accessed at the NCDC - http://www.ncdc.noaa.gov.

WFO Monthly/Daily Climate Data

```
000
CXUS56 KLOX 011655
CF6LGB
PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6)

                                        STATION:   LONG BEACH AIRPORT CA
                                        MONTH:     NOVEMBER
                                        YEAR:      2020
                                        LATITUDE:   33 49 N
                                        LONGITUDE: 118  9 W
```

	TEMPERATURE IN F:							:PCPN:	SNOW:	WIND			:SUNSHINE:		SKY		:PK WND	
1	2	3	4	5	6A	6B	7	8	9	10	11	12	13	14	15	16	17	18
									12Z	AVG	MX	2MIN						
DY	MAX	MIN	AVG	DEP	HDD	CDD	WTR	SNW	DPTH	SPD	SPD	DIR	MIN	PSBL	S-S	WX	SPD	DR
1	88	57	73	8	0	8	0.00	0.0	0	3.2	13	290	M	M	3	18	14	300
2	72	55	64	-1	1	0	0.00	0.0	0	3.0	10	190	M	M	3	128	13	210
3	77	60	69	5	0	4	0.00	0.0	0	3.4	13	300	M	M	4	18	14	300
4	83	56	70	6	0	5	0.00	0.0	0	3.3	15	310	M	M	0	18	16	310
5	95	58	77	13	0	12	0.00	0.0	0	3.8	15	290	M	M	0	8	17	290
6	70	58	64	0	1	0	T	0.0	0	9.4	21	260	M	M	7	1	29	270
7	62	54	58	-6	7	0	0.04	0.0	0	10.0	24	290	M	M	4		31	260
8	63	51	57	-6	8	0	T	0.0	0	13.1	32	280	M	M	5		43	290
9	61	43	52	-11	13	0	0.00	0.0	0	4.2	12	180	M	M	0		15	190
10	68	45	57	-6	8	0	0.00	0.0	0	3.8	16	300	M	M	0		19	290
11	65	43	54	-9	11	0	0.00	0.0	0	2.0	9	200	M	M	0		12	190
12	71	46	59	-3	6	0	0.00	0.0	0	3.0	15	290	M	M	0	18	17	290
13	66	47	57	-5	8	0	0.00	0.0	0	3.0	13	290	M	M	0	18	20	270
14	70	49	60	-2	5	0	0.00	0.0	0	3.7	10	310	M	M	0	1	12	280
15	87	49	68	6	0	3	0.00	0.0	0	4.5	14	290	M	M	0	18	16	290
16	92	56	74	13	0	9	0.00	0.0	0	3.6	12	200	M	M	0		15	200
17	74	51	63	2	2	0	0.00	0.0	0	3.4	10	300	M	M	0	1	12	310
18	67	55	61	0	4	0	0.00	0.0	0	4.2	13	290	M	M	7	18	16	290
19	70	55	63	3	2	0	0.00	0.0	0	4.3	10	300	M	M	4	18	13	310
20	75	52	64	4	1	0	0.00	0.0	0	2.6	12	310	M	M	0	18	16	300
21	75	50	63	3	2	0	0.00	0.0	0	1.7	9	300	M	M	1	128	10	310
22	67	49	58	-2	7	0	0.00	0.0	0	3.5	9	200	M	M	4	128	11	150
23	63	52	58	-2	7	0	0.00	0.0	0	3.2	8	190	M	M	5	128	12	180
24	66	52	59	0	6	0	0.00	0.0	0	2.3	9	180	M	M	2	18	14	200
25	66	48	57	-2	8	0	0.00	0.0	0	2.6	9	200	M	M	2	18	13	200
26	72	51	62	3	3	0	0.00	0.0	0	6.3	23	70	M	M	5	18	30	80
27	72	45	59	0	6	0	0.00	0.0	0	4.2	14	290	M	M	0		17	290
28	76	45	61	3	4	0	0.00	0.0	0	4.1	10	290	M	M	0		13	300
29	79	42	61	3	4	0	0.00	0.0	0	2.9	14	290	M	M	0		16	290
30	80	46	63	5	2	0	0.00	0.0	0	2.8	14	290	M	M	0		16	300
SM	2192	1520			126	41	0.04		0.0	125.1			M		56			
AV	73.1	50.7								4.2	FASTST		M	M	2	MAX(MPH)		
								MISC ---->		# 32	280					# 43	290	

NOTES:
LAST OF SEVERAL OCCURRENCES

COLUMN 17 PEAK WIND IN M.P.H.

PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6) , PAGE 2

STATION: LONG BEACH AIRPORT CA
MONTH: NOVEMBER
YEAR: 2020
LATITUDE: 33 49 N
LONGITUDE: 118 9 W

[TEMPERATURE DATA]

AVERAGE MONTHLY: 61.9
DPTR FM NORMAL: 0.5
HIGHEST: 95 ON 5
LOWEST: 42 ON 29

[PRECIPITATION DATA]

TOTAL FOR MONTH: 0.04
DPTR FM NORMAL: -0.96
GRTST 24HR 0.04 ON 7- 7

SNOW, ICE PELLETS, HAIL
TOTAL MONTH: 0.0 INCH
GRTST 24HR 0.0
GRTST DEPTH: 0

SYMBOLS USED IN COLUMN 16

1 = FOG OR MIST
2 = FOG REDUCING VISIBILITY TO 1/4 MILE OR LESS
3 = THUNDER
4 = ICE PELLETS
5 = HAIL
6 = FREEZING RAIN OR DRIZZLE
7 = DUSTSTORM OR SANDSTORM: VSBY 1/2 MILE OR LESS
8 = SMOKE OR HAZE
9 = BLOWING SNOW
X = TORNADO

[NO. OF DAYS WITH]

MAX 32 OR BELOW: 0
MAX 90 OR ABOVE: 2
MIN 32 OR BELOW: 0
MIN 0 OR BELOW: 0

[WEATHER - DAYS WITH]

0.01 INCH OR MORE: 1
0.10 INCH OR MORE: 0
0.50 INCH OR MORE: 0
1.00 INCH OR MORE: 0

[HDD (BASE 65)]
TOTAL THIS MO. 126
DPTR FM NORMAL -2
TOTAL FM JUL 1 130
DPTR FM NORMAL -19

CLEAR (SCALE 0-3) 20
PTCLDY (SCALE 4-7) 10
CLOUDY (SCALE 8-10) 0

[CDD (BASE 65)]
TOTAL THIS MO. 41
DPTR FM NORMAL 20
TOTAL FM JAN 1 1487
DPTR FM NORMAL 362

[PRESSURE DATA]
HIGHEST SLP 30.20 ON 28
LOWEST SLP 29.63 ON 6

[REMARKS]
#FINAL-11-20#

These data are preliminary and have not undergone final quality control by the National Climatic Data Center (NCDC). Therefore, these data are subject to revision. Final and certified climate data can be accessed at the NCDC - http://www.ncdc.noaa.gov.

Climatological Report (Monthly)

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877
CXUS56 KLOX 170202
CLMLGB

CLIMATE REPORT
NATIONAL WEATHER SERVICE LOS ANGELES/OXNARD
602 PM PST WED DEC 16 2020

.....................................

...THE LONG BEACH AIRPORT CA CLIMATE SUMMARY FOR THE MONTH OF NOVEMBER 2020...

CLIMATE NORMAL PERIOD: 1981 TO 2010
CLIMATE RECORD PERIOD: 1958 TO 2020
```

WEATHER	OBSERVED VALUE	DATE(S)	NORMAL VALUE	DEPART FROM NORMAL	LAST YEAR`S VALUE
TEMPERATURE (F)					
HIGHEST	95	11/05			
LOWEST	42	11/29			
AVG. MAXIMUM	73.1		72.1	1.0	
AVG. MINIMUM	50.7		50.8	-0.1	
MEAN	61.9		61.4	0.5	
DAYS MAX >= 90	2				
DAYS MAX <= 32	0				
DAYS MIN <= 32	0				
DAYS MIN <= 0	0				
PRECIPITATION (INCHES)					
TOTALS	0.04		1.00	-0.96	
DAILY AVG.	0.00				
DAYS >= .01	1				
DAYS >= .10	0				
DAYS >= .50	0				
DAYS >= 1.00	0				
GREATEST					
24 HR. TOTAL	0.04	11/07 TO 11/07			
STORM TOTAL	0.04				
DEGREE DAYS					
HEATING TOTAL	126		128	-2	108
SINCE 7/1	130		149	-19	111
COOLING TOTAL	41		21	20	40
SINCE 1/1	1487		1125	362	1418

```
.....................................

WIND (MPH)
AVERAGE WIND SPEED                4.2
HIGHEST WIND SPEED/DIRECTION      32/280    DATE  11/08
HIGHEST GUST SPEED/DIRECTION      43/290    DATE  11/08

SKY COVER
```

POSSIBLE SUNSHINE (PERCENT)	MM
AVERAGE SKY COVER	0.18
NUMBER OF DAYS FAIR	21
NUMBER OF DAYS PC	9
NUMBER OF DAYS CLOUDY	0

AVERAGE RH (PERCENT)	62

WEATHER CONDITIONS. NUMBER OF DAYS WITH

THUNDERSTORM	0	MIXED PRECIP	0
HEAVY RAIN	0	RAIN	0
LIGHT RAIN	3	FREEZING RAIN	0
LT FREEZING RAIN	0	HAIL	0
HEAVY SNOW	0	SNOW	0
LIGHT SNOW	0	SLEET	0
FOG	19	FOG W/VIS <= 1/4 MILE	4
HAZE	17		

\- INDICATES NEGATIVE NUMBERS.
R INDICATES RECORD WAS SET OR TIED.
MM INDICATES DATA IS MISSING.
T INDICATES TRACE AMOUNT.

[Explanation of the Preliminary Monthly Climate Data (F6) Product]

These data are preliminary and have not undergone final quality control by the National Climatic Data Center (NCDC). Therefore, these data are subject to revision. Final and certified climate data can be accessed at the NCDC - http://www.ncdc.noaa.gov.

WFO Monthly/Daily Climate Data

```
000
CXUS56 KLOX 011814
CF6LGB
PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6)

                                        STATION:   LONG BEACH AIRPORT CA
                                        MONTH:     DECEMBER
                                        YEAR:      2020
                                        LATITUDE:   33 49 N
                                        LONGITUDE: 118  9 W
```

	TEMPERATURE IN F:							PCPN:	SNOW:	WIND				SUNSHINE:		SKY	PK WND	
1	2	3	4	5	6A	6B	7	8	9	10	11	12	13	14	15	16	17	18
									12Z	AVG	MX	2MIN						
DY	MAX	MIN	AVG	DEP	HDD	CDD	WTR	SNW	DPTH	SPD	SPD	DIR	MIN	PSBL	S-S	WX	SPD	DR
1	73	44	59	1	6	0	0.00	0.0	0	1.6	8	190	M	M	0	8	12	200
2	74	44	59	1	6	0	0.00	0.0	0	4.3	21	60	M	M	0	8	31	100
3	75	49	62	5	3	0	0.00	0.0	0	7.4	24	80	M	M	1	8	36	90
4	76	45	61	4	4	0	0.00	0.0	0	4.1	13	290	M	M	0		15	280
5	72	41	57	0	8	0	0.00	0.0	0	1.9	7	120	M	M	0	18	9	140
6	74	41	58	1	7	0	0.00	0.0	0	2.8	10	310	M	M	0	18	12	300
7	76	44	60	3	5	0	0.00	0.0	0	3.8	15	110	M	M	0	8	18	110
8	83	55	69	12	0	4	0.00	0.0	0	5.6	18	90	M	M	0	8	26	80
9	75	52	64	8	1	0	0.00	0.0	0	3.4	14	300	M	M	0		16	290
10	63	46	55	-1	10	0	0.00	M	M	3.5	13	200	M	M	2		18	130
11	63	45	54	-2	11	0	0.00	M	M	2.0	12	190	M	M	4	18	14	190
12	66	46	56	0	9	0	0.00	M	M	3.3	18	290	M	M	2	18	21	280
13	72	47	60	4	5	0	0.00	M	M	5.5	14	290	M	M	1	18	24	220
14	68	48	58	2	7	0	T	M	M	6.9	20	280	M	M	4	1	24	280
15	70	43	57	1	8	0	0.00	M	M	3.3	14	290	M	M	0		17	260
16	72	44	58	2	7	0	0.00	M	M	1.9	10	300	M	M	0	8	11	300
17	63	48	56	0	9	0	0.00	M	M	3.6	16	290	M	M	2	18	20	290
18	71	44	58	2	7	0	0.00	M	M	2.8	13	310	M	M	0	1	16	310
19	72	43	58	2	7	0	0.00	M	M	4.4	12	290	M	M	0		14	280
20	81	42	62	6	3	0	0.00	M	M	4.2	12	290	M	M	0		14	290
21	83	46	65	9	0	0	0.00	M	M	4.1	13	300	M	M	0	1	14	300
22	64	48	56	0	9	0	0.00	M	M	2.5	8	120	M	M	1	1	12	190
23	70	49	60	4	5	0	0.00	M	M	4.7	20	80	M	M	1	18	26	80
24	65	52	59	3	6	0	T	M	M	6.9	17	80	M	M	2		24	70
25	74	47	61	5	4	0	0.00	M	M	4.1	17	290	M	M	0	8	21	290
26	70	44	57	1	8	0	0.00	M	M	1.7	15	280	M	M	0	18	18	290
27	63	54	59	3	6	0	0.00	M	M	3.9	10	220	M	M	6		14	190
28	57	44	51	-5	14	0	1.49	M	M	6.8	20	340	M	M	8	13	26	250
29	63	41	52	-4	13	0	0.00	M	M	3.1	8	160	M	M	0		10	170
30	70	41	56	0	9	0	0.00	M	M	2.9	14	280	M	M	0		16	270
31	68	41	55	-1	10	0	0.00	M	M	4.4	17	300	M	M	0		21	280
SM	2186	1418			207	4	1.49	0.0		121.4			M		34			
AV	70.5	45.7								3.9	FASTST		M	M	1	MAX(MPH)		

```
                                MISC ---->    24  80                  36  90
================================================================================
NOTES:
# LAST OF SEVERAL OCCURRENCES

COLUMN 17 PEAK WIND IN M.P.H.

PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6) , PAGE 2

                                          STATION:   LONG BEACH AIRPORT CA
                                          MONTH:     DECEMBER
                                          YEAR:      2020
                                          LATITUDE:   33 49 N
                                          LONGITUDE: 118  9 W

[TEMPERATURE DATA]      [PRECIPITATION DATA]       SYMBOLS USED IN COLUMN 16

AVERAGE MONTHLY: 58.1   TOTAL FOR MONTH:   1.49    1 = FOG OR MIST
DPTR FM NORMAL:   1.8   DPTR FM NORMAL:   -0.46    2 = FOG REDUCING VISIBILITY
HIGHEST:    83 ON 21, 8  GRTST 24HR  1.49 ON 28-28      TO 1/4 MILE OR LESS
LOWEST:     41 ON 29,31                            3 = THUNDER
                        SNOW, ICE PELLETS, HAIL    4 = ICE PELLETS
                        TOTAL MONTH:   0.0 INCH    5 = HAIL
                        GRTST 24HR  0.0            6 = FREEZING RAIN OR DRIZZLE
                        GRTST DEPTH:  0            7 = DUSTSTORM OR SANDSTORM:
                                                       VSBY 1/2 MILE OR LESS
                                                   8 = SMOKE OR HAZE
[NO. OF DAYS WITH]      [WEATHER - DAYS WITH]      9 = BLOWING SNOW
                                                   X = TORNADO
MAX 32 OR BELOW:   0    0.01 INCH OR MORE:   1
MAX 90 OR ABOVE:   0    0.10 INCH OR MORE:   1
MIN 32 OR BELOW:   0    0.50 INCH OR MORE:   1
MIN  0 OR BELOW:   0    1.00 INCH OR MORE:   1

[HDD (BASE 65) ]
TOTAL THIS MO.   207    CLEAR  (SCALE 0-3)  27
DPTR FM NORMAL   -64    PTCLDY (SCALE 4-7)   4
TOTAL FM JUL 1   337    CLOUDY (SCALE 8-10)  0
DPTR FM NORMAL   -82

[CDD (BASE 65) ]
TOTAL THIS MO.     4
DPTR FM NORMAL     3    [PRESSURE DATA]
TOTAL FM JAN 1  1491    HIGHEST SLP 30.30 ON 24
DPTR FM NORMAL   365    LOWEST  SLP 29.84 ON 28

[REMARKS]
#FINAL-12-20#
```

These data are preliminary and have not undergone final quality control by the National Climatic Data Center (NCDC). Therefore, these data are subject to revision. Final and certified climate data can be accessed at the NCDC - http://www.ncdc.noaa.gov.

Climatological Report (Monthly)

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000
CXUS56 KLOX 020001
CLMLGB

CLIMATE REPORT
NATIONAL WEATHER SERVICE LOS ANGELES/OXNARD
401 PM PST FRI JAN 01 2021

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...THE LONG BEACH AIRPORT CA CLIMATE SUMMARY FOR THE MONTH OF DECEMBER 2020...

CLIMATE NORMAL PERIOD: 1981 TO 2010
CLIMATE RECORD PERIOD: 1958 TO 2020
```

WEATHER	OBSERVED VALUE	DATE(S)	NORMAL VALUE	DEPART FROM NORMAL	LAST YEAR`S VALUE
TEMPERATURE (F)					
HIGHEST	83	12/08 12/21			
LOWEST	41	12/30 12/31 12/29			
AVG. MAXIMUM	70.5		66.8	3.7	
AVG. MINIMUM	45.7		45.8	-0.1	
MEAN	58.1		56.3	1.8	
DAYS MAX >= 90	0				
DAYS MAX <= 32	0				
DAYS MIN <= 32	0				
DAYS MIN <= 0	0				
PRECIPITATION (INCHES)					
TOTALS	1.49		1.95	-0.46	
DAILY AVG.	0.05				
DAYS >= .01	1				
DAYS >= .10	1				
DAYS >= .50	1				
DAYS >= 1.00	1				
GREATEST					
24 HR. TOTAL	1.49	12/28 TO 12/28			
STORM TOTAL	1.49				
DEGREE DAYS					
HEATING TOTAL	207		271	-64	271
SINCE 7/1	337		419	-82	382
COOLING TOTAL	4		1	3	0
SINCE 1/1	1491		1126	365	1418

```
.....

WIND (MPH)
AVERAGE WIND SPEED             3.9
HIGHEST WIND SPEED/DIRECTION   24/080    DATE  12/03
```

HIGHEST GUST SPEED/DIRECTION 36/090 DATE 12/03

SKY COVER
POSSIBLE SUNSHINE (PERCENT) MM
AVERAGE SKY COVER 0.11
NUMBER OF DAYS FAIR 27
NUMBER OF DAYS PC 3
NUMBER OF DAYS CLOUDY 1

AVERAGE RH (PERCENT) 53

WEATHER CONDITIONS. NUMBER OF DAYS WITH

THUNDERSTORM	1	MIXED PRECIP	0
HEAVY RAIN	1	RAIN	1
LIGHT RAIN	2	FREEZING RAIN	0
LT FREEZING RAIN	0	HAIL	0
HEAVY SNOW	0	SNOW	0
LIGHT SNOW	0	SLEET	0
FOG	13	FOG W/VIS <= 1/4 MILE	0
HAZE	15		

\- INDICATES NEGATIVE NUMBERS.
R INDICATES RECORD WAS SET OR TIED.
MM INDICATES DATA IS MISSING.
T INDICATES TRACE AMOUNT.

Attachment 3

Dominguez Channel Estuary
April 2020
Sediment Monitoring Report

Prepared for:
Tesoro Refining & Marketing Company LLC
Los Angeles Refinery – Carson Operations
1801 East Sepulveda Boulevard
Carson, CA 90745

Prepared by:
WGR Southwest, Inc.
11021 Winners Circle, Suite 101
Los Alamitos, CA 90720

Date:
September 11, 2020

TESORO REFINING & MARKETING COMPANY LLC
LOS ANGELES REFINERY – CARSON OPERATIONS
DOMINGUEZ CHANNEL ESTUARY SEDIMENT MONITORING REPORT 2020

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1.0 Introduction 1

2.0 Sediment Monitoring 1

3.0 Laboratory Results 2

4.0 Executive Summary 2

TABLES

Table 2.0: Sediment Monitoring Field Observation and Analyses

FIGURES

Figure 1: Dominguez Channel Estuary Sediment Monitoring Locations

ATTACHMENTS

Attachment 1: Sediment Monitoring Field Logs

Attachment 2, Table 1: Sediment Monitoring Laboratory Result Summary Table

Attachment 2, Table 2: Sediment Monitoring Particle Grain Size Summary Table

Attachment 3: Sediment Monitoring Eurofins Calscience Analytical Laboratory Report

Attachment 4: Sediment Monitoring Aquatic Bioassay Analytical Laboratory Report

Attachment 5: Organic/Inorganic Analytical Validation Report

Attachment 6: Sediment Bioassay Data Validation Report

1.0 Introduction

On behalf of Tesoro Refining & Marketing Company LLC Los Angeles Refinery – Carson Operations (Tesoro LAR Carson), WGR Southwest, Inc. (WGR) conducted sediment monitoring of the Dominguez Channel Estuary in accordance with National Pollutant Discharge Elimination System Waste Discharge Requirements Permit Number CA0000680 Order Number R4-2015-0259 (WDR Permit). As required in Table E-7 of WDR Permit Attachment E, Monitoring and Reporting Program Number 5424 (MRP No. 5424), sediment monitoring is required at least once a year for all parameters and at least twice a year for Chronic Toxicity regardless of Tesoro LAR Carson discharge associated with the WDR Permit[1]. Therefore, this report constitutes sediment monitoring for the first event of the 2020 reporting year, where the sediment samples collected were analyzed for all required parameters and all required monitoring (i.e. field observations and field analyses) was completed.

2.0 Sediment Monitoring

As shown in Figure 1, the WDR Permit designates seven sediment monitoring locations: SED-001, SED-002, SED-003, SED-004, SED-005, SED-006, and SED-007. WGR field personnel utilized an Ekman dredge and a Horiba U-50 Series Multi-Parameter Meter. According to historic Tesoro LAR Carson Sediment Monitoring Reports, samplers have been unable to collect sediment samples from SED-001 since 2003, SED-002 since 2003, SED-003 since 2009, SED-004 since 2009, and have infrequently collected sediment samples from SED-005 since 2009.

Sediment monitoring was attempted at all designated sediment monitoring locations on April 30, 2020. As detailed in the field logs (see Attachment 1), sediment samples and associated monitoring could only be feasibly completed at four of the seven sediment monitoring locations. Table 2.0 provides a summary of the field observations and analyses.

Table 2.0: Sediment Monitoring Field Observation and Analyses

Sample ID	Field Observations			Field Analyses					
	Sediment Description	Biological Matter	Pollutants	pH (SU)	Salinity (PPT)	DO (mg/L)	SC (mS/Cm)	Turbidity (NTU)	Flow
SED-001	Not Sampled	Not Sampled	Not Sampled	--	--	--	--	--	--
SED-002	Not Sampled	Not Sampled	Not Sampled	--	--	--	--	--	--
SED-003	Not Sampled	Not Sampled	Not Sampled	--	--	--	--	--	--

[1] Tesoro LAR Carson did not discharge under the WDR Permit during the 2020 calendar year.

Table 2.0: Sediment Monitoring Field Observation and Analyses

Sample ID	Field Observations			Field Analyses					
	Sediment Description	Biological Matter	Pollutants	pH (SU)	Salinity (PPT)	DO (mg/L)	SC (mS/Cm)	Turbidity (NTU)	Flow
SED-004	Dark in color, no odor	Vegetation, shells, rocks	Some trash/debris	7.91	23.7	4.65	37.4	11.8	1
SED-005	Dark in color, decaying odor	Vegetation and rocks	Some trash/debris	7.75	21.6	4.30	34.4	8.3	1
SED-006	Dark in color, decaying odor	Vegetation	Some trash/debris	7.61	19.9	4.21	31.9	8.8	1
SED-007	Dark in color, decaying odor	Vegetation	Some trash/debris	7.37	18.3	4.1	29.4	7.5	1

DO: Dissolved Oxygen
SC: Specific Conductance

3.0 Laboratory Results

Table 2.0 summarizes the field observations and analyses for the April 2020 sediment monitoring event. Laboratory results are summarized in Attachment 2. The Eurofins Calscience laboratory report is in Attachment 3 and the Aquatic Bioassay laboratory report is in Attachment 4. Data validation reports for these laboratory analytical reports are in Attachment 5 and Attachment 6.

4.0 Executive Summary

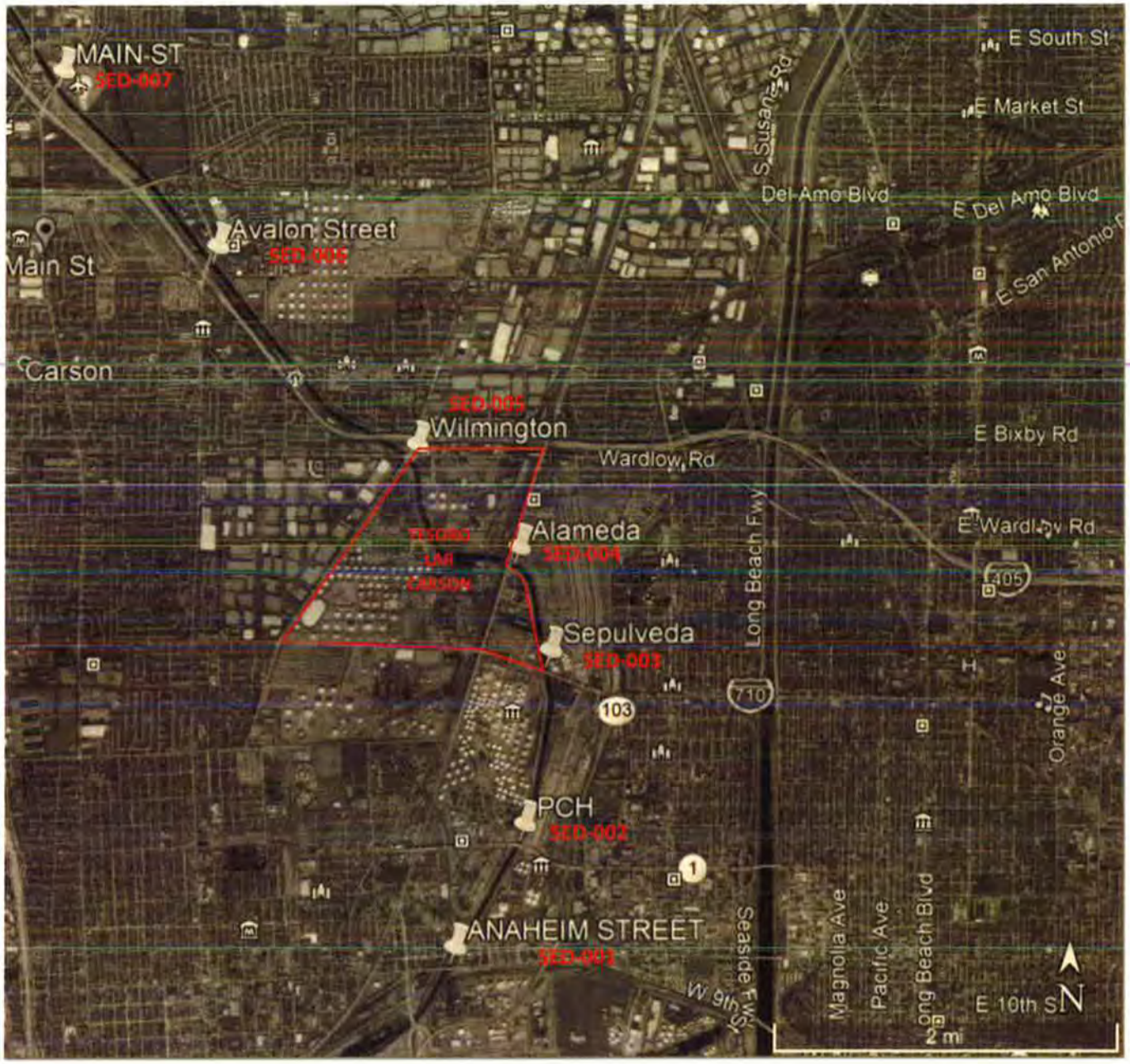
Receiving water sediment monitoring and analysis was conducted independent of any discharge from Tesoro LAR Carson. Pollutant concentrations demonstrated in this report are not associated with any contribution from Tesoro LAR Carson to the receiving water. There are no pollutant concentration limits associated with this type of sampling as prescribed by the WDR Permit. Receiving water sediment monitoring and analysis was completed in compliance with the WDR Permit Attachment E, MRP No. 5424. As noted in the Organic/Inorganic Analytical Validation Report and the Sediment Bioassay Data Validation Report included in Attachment 5 and 6, respectively, analytical data obtained for this sampling event was deemed acceptable. No instances of non-compliance were identified.

FIGURE 1

DOMINGUEZ CHANNEL ESTUARY
SEDIMENT MONITORING LOCATIONS

Tesoro Refining & Marketing Company LLC
Los Angeles Refinery – Carson Operations
Dominguez Channel Estuary
April 2020 Sediment Monitoring Report

Figure 1: Dominguez Channel Estuary Sediment Monitoring Locations



Tesoro Refining & Marketing Company LLC
Los Angeles Refinery – Carson Operations
Dominguez Channel Estuary
Sediment Monitoring Report

ATTACHMENT 1

SEDIMENT MONITORING
FIELD LOGS

Tesoro Refining & Marketing Company LLC
Los Angeles Refinery – Carson Operations
Dominguez Channel Estuary
April 2020 Sediment Monitoring Report

WGR Southwest, Inc. Field Log		Page 1 of 3 Date: 4-30-2020
Project Name: UARC Sediment 2020	Field Personnel: Amber Ballrot	
Project Number: 021.APC.01	Field Personnel: Dave Montelongo	
Field Conditions/Project Discrepancies: overcast, 64°F, light breeze		

Time	Field Notes
0800	Arrive @ WGR office, load equipment, discuss safety
	and gather personal protective equipment
0845	Leave office
0915	Arrive @ SED-007, unload equipment
	Walk east approx. 129 ft. from NW corner of bridge
	to sample point - sample within 10 ft laterally from SP (cycle direction)
	31 ft from top of bridge to water line
	minimal trash in channel, vegetation along sides
	shallow water depth (less than 10 ft)
1100	Begin filling jars/bags, label and preserve
	HORIBA: 24.38°C; 7.37 pH; 29.4 mS/cm;
	7.5 NTU; 4.1 mg/L DO; 18.3 ppt salinity
	→ water sample collected and analyzed within
	15 minutes
1115	complete sample collection preservation and
	decon equipment
	load up for next sample point
1130	leave SED-007 area
1140	arrive SED-006, unload equipment
	Walk west approx 140 ft. from SE corner of bridge
	to sample pt. - sample within 10 ft laterally from SP (cycle direction)
	29 ft from top of bride to water line
	minimal trash in channel, vegetation along sides
	water depth between 10-20 ft
1230	Begin filling jars/bags, label and preserve
	HORIBA: 25.43°C, 7.61 pH; 31.9 mS/cm,
	8.8 NTU; 7.21 mg/L DO; 19.9 ppt salinity
	→ water sample collected and analyzed within 15 min.
	complete sample collection, decon equipment
	load up for next sample point
1245	Leave SED-006 area

very fine sediment with bio matter / vegetation debris, odor

fine sed. same as 007 debris, odor

WGR Southwest, Inc. Field Log		Page 2 of 3
		Date: 4-30-2020
Project Name: LARC Sediment 2020	Field Personnel: Amber Bullrot	
Project Number: 021.APC.01	Field Personnel: Dave Montelongo	
Field Conditions/Project Discrepancies: overcast burning out, sun coming out		

Time	Field Notes
1245	visit store to purchase additional plastic sample collection bags and PPE
1315	LUNCH BREAK
1345	arrive @ SED-005 area
	walk 117 ft west from NE corner of bridge to sample area - sample 10 ft in either direction
	measure 27 ft from top of bridge to water line
	minimal trash in channel, vegetation along sides;
1425	sediment is murky with less debris than SED-006/007
	water depth approx 10-20 ft
	Begin filling jars/bags, preserving samples
1430	HORIBA: 25.76°C; 7.75 pH, 34.4 mS/cm, 8.3 NTU, 4.3 mg/L DO, 21.6 ppt salinity
	↳ water sample collected and analyzed w/in 15 min
	decon equipment
	load up for next sample point
1445	leave SED-005 area
1500	Arrive SED-004
	walk 80 ft ~~from~~ north from SE corner of bridge
	to sample area - collect 10 ft in either direction
	measure 27 ft from top of bridge to water line
	minimal trash in channel, sparse vegetation along sides
	coarse sediment, murky w/ little debris - many shells/rocks, no odor
	water depth approx 20 ft
1605	Begin filling jars/bags, preserving samples
	HORIBA: 24.91°C; 7.91 pH, 37.4 mS/cm,
	11.8 NTU, 4.65 mg/L DO, 23.7 ppt salinity
	↳ water samples collected and analyzed w/in 15 min
	decon equip
1630	load up and leave

fine, some coarse, some rocks, decomp odor

WGR Southwest, Inc. Field Log		Page 3 of 3 Date: 4-30-2020
Project Name: LTRC Sediment 2020	Field Personnel: Amber Ballrot	
Project Number: 021.APC.01	Field Personnel: Dave Montelongo	
Field Conditions/Project Discrepancies: sunny, slight wind		

Time	Field Notes
1645	Arrive SED-003
	walk 120 ft. west from NE corner of bridge to sample point – attempt collection 10 ft either direction measure 24 ft from top of bridge to water line
	some trash in channel. sparse vegetation along sides
	water depth approx 10 ft
	attempt 6 dredge drops, collected only vegetation and shells w/ some mud covering them
	dump minimal collection and abandon further attempts
1700	decon equipment and load up for next sample point
1715	leave SED-003 area
1720	arrive SED-002 area, nowhere to safely park and stage equipment, bridge on both sides covered in chain link fencing – unable to attempt sample collection
1730	arrive SED-001 area
	walk 1668 feet west from NE corner of bridge to sample point – attempt collection w/in 10 ft either direction
	measure 56 feet from top of bridge to water line
	plenty of trash in channel, vegetation along sides
	water depth approx. 10 ft.
	attempt 5 dredge drops. collected minor amount of shells/algae – dump back and abandon further attempts
	decon equipment and load up
1800	leave for office
1830	arrive office, unload equipment and repackage rental equipment for shipment
1900	transfer samples to fridge and prepare COCs
	END

sampler noted river bottom seemed very rocky, difficult to trigger dredge release pins as dredge not lying flat on riverbed

ATTACHMENT 2

SEDIMENT MONITORING
LABORATORY RESULT SUMMARY TABLE
AND
PARTICLE GRAIN SIZE SUMMARY TABLE

Tesoro Refining Marketing Company LLC
Los Angeles Refinery - Carson Operations

Dominguez Channel Estuary April 2020 Sediment Monitoring Report - Attachment 2, Table 1
Sediment Monitoring Laboratory Result Summary Table

Sample ID	SED-001	SED-002	SED-003	SED-004	SED-005	SED-006	SED-007
Date Sampled	NS	NS	NS	4/30/2020	4/30/2020	4/30/2020	4/30/2020
Time Sampled	NS	NS	NS	16:10	14:30	12:30	11:04
Total Metals							
Cadmium (EPA 6020) (mg/Kg)	NS	NS	NS	ND<0.806	ND<0.851	1.26	0.862
Chromium (EPA 6020) (mg/Kg)	NS	NS	NS	26.8	26	24.4	12.1
Copper (EPA 6020) (mg/Kg)	NS	NS	NS	77.8	90.9	68.8	46.6
Lead (EPA 6020) (mg/Kg)	NS	NS	NS	201	54.7	48.7	35.6
Nickel (EPA 6020) (mg/Kg)	NS	NS	NS	7.64	8.08	10.1	9.07
Zinc (EPA 6020) (mg/Kg)	NS	NS	NS	304	329	479	292
Mercury (EPA 7471A) (mg/Kg)	NS	NS	NS	0.137	0.100	0.0468	0.0516
Volatile/Semi-Volatile Organic Compounds							
Chlordane (EPA 8081A) (ug/Kg)	NS	NS	NS	13	14	65	12
DDT (EPA 8081A) (ug/Kg, sum of 4,4'-DDT, 2,4'-DDT, 4,4'-DDE, 2,4'-DDE, 4,4'-DDD, and 2,4'-DDD)	NS	NS	NS	19.9	19.3	54.3	13
PCBs (EPA 8082) (ug/Kg, sum of Arochlor 1016, Arochlor 1221, Arochlor 1232, Arochlor 1242, Arochlor 1248, Arochlor 1254, and Arochlor 1260)	NS	NS	NS	49	196	152	168
PAHs (EPA 8270C) (mg/Kg, sum of acenaphthene, anthracene, 1,2-benzanthracene, 3,4-benzofluoranthene, benzo(k)fluoranthene, 1,12-benzoperylene, benzo(a)pyrene, chrysene, dibenzo(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, and pyrene)	NS	NS	NS	1.3899	1.395	2.254	0.7014
Total Petroleum Hydrocarbons (EPA 8015B) (mg/Kg)	NS	NS	NS	23	70	295	218.42
Sediment Grain Size (ASTM D4464)	Refer to Attachment 2, Table 2						
Total Organic Carbon (EPA 9060A) (mg/Kg)	NS	NS	NS	31,800	38,900	30,700	22,600
Tributyltin (Krone et al.) (ug/Kg)	NS	NS	NS	ND<2.5	ND<2.8	ND<2.5	ND<2.6
Chronic Toxicity							
Eohaustorius estuarius (NOEC in mg/L)	NS	NS	NS	100%	100%	100%	100%
Mytilus galloprovincialis (NOEC in mg/L)	NS	NS	NS	100%	100%	100%	100%

NS = Not Sampled
ND = Non-Detect
NOEC = No Observed Effect Concentration

Tesoro Refining Marketing Company LLC
Los Angeles Refinery - Carson Operations

Dominguez Channel Estuary April 2020 Sediment Monitoring Report - Attachment 2, Table 2
Sediment Monitoring Particle Grain Size Summary Table

Sample ID	Mean Grain Size (mm)	Particle Size Distribution (Weight Percent)								
		Total Silt & Clay (0 - 0.0626 mm)	Clay (< 0.00391 mm)	Silt (0.00391 - 0.0625 mm)	Very Fine Sand (0.0625 - 0.125 mm)	Fine Sand (0.125 - 0.25 mm)	Medium Sand (0.25 - 0.5 mm)	Coarse Sand (0.5 - 1 mm)	Very Coarse Sand (1 - 2 mm)	Gravel (>2 mm)
SED-001	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SED-002	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SED-003	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SED-004	0.042	75.95	12.19	63.76	13.94	10.10	ND<0.01	ND<0.01	ND<0.01	ND<0.01
SED-005	0.032	83.01	16.11	66.90	12.11	4.88	ND<0.01	ND<0.01	ND<0.01	ND<0.01
SED-006	0.226	37.10	4.48	32.62	9.22	17.59	19.04	17.06	ND<0.01	ND<0.01
SED-007	0.043	76.07	12.62	63.45	12.56	11.36	0.01	ND<0.01	ND<0.01	ND<0.01

NS = Not Sampled
ND = Non-Detect

ATTACHMENT 3

SEDIMENT MONITORING
EUROFINS CALSCIENCE
ANALYTICAL LABORATORY REPORT

eurofins | Environment Testing America

ANALYTICAL REPORT

Eurofins Calscience LLC
7440 Lincoln Way
Garden Grove, CA 92841
Tel: (714)895-5494

Laboratory Job ID: 570-27181-1
Client Project/Site: WGR - Tesoro LA Refinery

For:
WGR Southwest Inc
11021 Winners Circle
Suite 101
Los Alamitos, California 90720

Attn: Amber Ballrot

Authorized for release by:
5/22/2020 9:39:05 PM

Xuan Dang, Project Manager I
(714)895-5494
xuandang@eurofinsus.com

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Definitions/Glossary

Client: WGR Southwest Inc
Project/Site: WGR - Tesoro LA Refinery

Job ID: 570-27181-1

Qualifiers

GC/MS Semi VOA

Qualifier	Qualifier Description
F1	MS and/or MSD recovery exceeds control limits.
F2	MS/MSD RPD exceeds control limits
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

GC Semi VOA

Qualifier	Qualifier Description
E	Result exceeded calibration range.
F1	MS and/or MSD recovery exceeds control limits.
F2	MS/MSD RPD exceeds control limits
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
p	The %RPD between the primary and confirmation column/detector is >40%. The lower value has been reported.
X	Surrogate recovery exceeds control limits

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 570-27181-1

Laboratory: Eurofins Calscience LLC

Narrative

Job Narrative
570-27181-1

Comments
No additional comments.

Receipt
The samples were received on 5/1/2020 1:56 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.0° C.

GC/MS Semi VOA
Method 8270C SIM: The matrix spike / matrix spike duplicate / sample duplicate (MS/MSD/DUP) precision for preparation batch 570-66884 and 570-67217 and analytical batch 570-68220 was outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample / laboratory control sample duplicate (LCS/LCSD) precision was within acceptance limits.

Method 8270C SIM: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for preparation batch 570-66884 and 570-67217 and analytical batch 570-68220 were outside control limits. Sample matrix interference is suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GC Semi VOA
Method 8081A: Surrogate recovery for the following samples were outside control limits: SED-004 (570-27181-1), SED-005 (570-27181-2), SED-006 (570-27181-3), SE-D-007 (570-27181-4), (570-27181-B-1-B MS) and (570-27181-B-1-C MSD). Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

Method 8081A: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for preparation batch 570-69209 and 570-69126 and analytical batch 570-68894 were outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) recovery were within acceptance limits.

Method 8081A: Surrogate recovery for the following samples were outside control limits: (570-27181-A-1-E MS) and (570-27181-A-1-H MSD). Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

Method 8081A: The following samples were diluted due to the nature of the sample matrix: SED-004 (570-27181-1), SED-005 (570-27181-2), SED-006 (570-27181-3) and SE-D-007 (570-27181-4). Elevated reporting limits (RLs) are provided.

Method 8082: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for preparation batch 570-66884 and 570-67132 and analytical batch 570-68205 were outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

Method 8082: The following samples appears to contain polychlorinated biphenyls (PCBs); however, due to weathering or other environmental processes, the PCBs in the sample do not closely match any of the laboratory's Aroclor standards used for instrument calibration: SED-005 (570-27181-2) and SED-006 (570-27181-3). The sample(s) has been quantified and reported as Aroclor 1260. Due to the poor match with the Aroclor standard(s), there is increased qualitative and quantitative uncertainty associated with this result.

Method 8082: The following sample appears to contain polychlorinated biphenyls (PCBs); however, due to weathering or other environmental processes, the PCBs in the sample do not closely match any of the laboratory's Aroclor standards used for instrument calibration: SED-004 (570-27181-1). The sample(s) has been quantified and reported as Aroclor 1254. Due to the poor match with the Aroclor standard(s), there is increased qualitative and quantitative uncertainty associated with this result.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Metals
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Job ID: 570-27181-1 (Continued)

Laboratory: Eurofins Calscience LLC (Continued)

4

General Chemistry
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Organic Prep
Method D4464: The sample duplicate precision for the following sample associated with analytical batch 570-68372 was flagged as being outside control limits due to a LIMS limitation: (570-27622-B-3) and (570-27622-B-3 DU). The mean grain size for the sample and sample duplicate were within RPD acceptance criteria.

(570-27622-B-3) and (570-27622-B-3 DU)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: WGR Southwest Inc
Project/Site: WGR - Tesoro LA Refinery

Job ID: 570-27181-1

Client Sample ID: SED-004

Lab Sample ID: 570-27181-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acenaphthene	0.0045	J	0.035	0.0018	mg/Kg	2	☼	8270C SIM	Total/NA
Anthracene	0.031	J	0.035	0.0023	mg/Kg	2	☼	8270C SIM	Total/NA
1,2-Benzanthracene	0.097		0.035	0.0038	mg/Kg	2	☼	8270C SIM	Total/NA
Benzo[a]pyrene	0.13		0.035	0.0047	mg/Kg	2	☼	8270C SIM	Total/NA
3,4-Benzofluoranthene	0.15		0.035	0.0050	mg/Kg	2	☼	8270C SIM	Total/NA
Benzo[k]fluoranthene	0.11		0.035	0.0056	mg/Kg	2	☼	8270C SIM	Total/NA
1,12-Benzoperylene	0.12		0.035	0.0051	mg/Kg	2	☼	8270C SIM	Total/NA
Chrysene	0.22		0.035	0.0027	mg/Kg	2	☼	8270C SIM	Total/NA
Dibenz(a,h)anthracene	0.032	J	0.035	0.0037	mg/Kg	2	☼	8270C SIM	Total/NA
Fluoranthene	0.20		0.035	0.0034	mg/Kg	2	☼	8270C SIM	Total/NA
Fluorene	0.0054	J	0.035	0.0029	mg/Kg	2	☼	8270C SIM	Total/NA
Indeno[1,2,3-cd]pyrene	0.060		0.035	0.0043	mg/Kg	2	☼	8270C SIM	Total/NA
1-Methylnaphthalene	0.0092	J	0.035	0.0025	mg/Kg	2	☼	8270C SIM	Total/NA
2-Methylnaphthalene	0.015	J	0.035	0.0025	mg/Kg	2	☼	8270C SIM	Total/NA
Naphthalene	0.015	J	0.035	0.0027	mg/Kg	2	☼	8270C SIM	Total/NA
Phenanthrene	0.088		0.035	0.0029	mg/Kg	2	☼	8270C SIM	Total/NA
Pyrene	0.23		0.035	0.0026	mg/Kg	2	☼	8270C SIM	Total/NA
C6-C44	23		9.1	6.5	mg/Kg	1	☼	8015B	Total/NA
2,4'-DDD	0.78	J p	0.99	0.15	ug/Kg	1		8081A	Total/NA
4,4'-DDD	6.4		0.99	0.24	ug/Kg	1		8081A	Total/NA
4,4'-DDE	11		5.0	0.83	ug/Kg	5		8081A	Total/NA
4,4'-DDT	1.7	p	0.99	0.30	ug/Kg	1		8081A	Total/NA
Chlordane	13	p	9.9	0.67	ug/Kg	1		8081A	Total/NA
Aroclor-1254	49		17	2.0	ug/Kg	1	☼	8082	Total/NA
Chromium	26.8		3.58	0.537	mg/Kg	20	☼	6020	Total/NA
Copper	77.8		1.79	0.482	mg/Kg	20	☼	6020	Total/NA
Lead	201		1.79	0.385	mg/Kg	20	☼	6020	Total/NA
Nickel	7.64		1.79	0.484	mg/Kg	20	☼	6020	Total/NA
Zinc	304		8.96	8.27	mg/Kg	20	☼	6020	Total/NA
Mercury	0.137	J	0.149	0.0105	mg/Kg	1	☼	7471A	Total/NA
Carbon, Total Organic	31800		878	305	mg/Kg	1	☼	9060A	Total/NA
Clay(less than 0.00391 mm)	12.19		0.01	0.01	%	1		D4464	Total/NA
Fine Sand (0.125 to 0.25mm)	10.10		0.01	0.01	%	1		D4464	Total/NA
Silt (0.00391 to 0.0625mm)	63.76		0.01	0.01	%	1		D4464	Total/NA
Total Silt and Clay (0 to 0.0626mm)	75.95		0.01	0.01	%	1		D4464	Total/NA
Very Fine Sand (0.0625 to 0.125 mm)	13.94		0.01	0.01	%	1		D4464	Total/NA

Client Sample ID: SED-005

Lab Sample ID: 570-27181-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acenaphthene	0.0046	J	0.038	0.0019	mg/Kg	2	☼	8270C SIM	Total/NA
Anthracene	0.027	J	0.038	0.0025	mg/Kg	2	☼	8270C SIM	Total/NA
1,2-Benzanthracene	0.090		0.038	0.0042	mg/Kg	2	☼	8270C SIM	Total/NA
Benzo[a]pyrene	0.12		0.038	0.0051	mg/Kg	2	☼	8270C SIM	Total/NA
3,4-Benzofluoranthene	0.15		0.038	0.0055	mg/Kg	2	☼	8270C SIM	Total/NA
Benzo[k]fluoranthene	0.14		0.038	0.0061	mg/Kg	2	☼	8270C SIM	Total/NA
1,12-Benzoperylene	0.097		0.038	0.0055	mg/Kg	2	☼	8270C SIM	Total/NA
Chrysene	0.21		0.038	0.0029	mg/Kg	2	☼	8270C SIM	Total/NA
Dibenz(a,h)anthracene	0.027	J	0.038	0.0040	mg/Kg	2	☼	8270C SIM	Total/NA
Fluoranthene	0.21		0.038	0.0037	mg/Kg	2	☼	8270C SIM	Total/NA
Fluorene	0.0046	J	0.038	0.0032	mg/Kg	2	☼	8270C SIM	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Calscience LLC

Client Sample ID: SED-005 (Continued)

Lab Sample ID: 570-27181-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Indeno[1,2,3-cd]pyrene	0.055		0.038	0.0047	mg/Kg	2	☼	8270C SIM	Total/NA
1-Methylnaphthalene	0.0054	J	0.038	0.0027	mg/Kg	2	☼	8270C SIM	Total/NA
2-Methylnaphthalene	0.012	J	0.038	0.0027	mg/Kg	2	☼	8270C SIM	Total/NA
Naphthalene	0.015	J	0.038	0.0029	mg/Kg	2	☼	8270C SIM	Total/NA
Phenanthrene	0.079		0.038	0.0032	mg/Kg	2	☼	8270C SIM	Total/NA
Pyrene	0.26		0.038	0.0028	mg/Kg	2	☼	8270C SIM	Total/NA
C25-C28	8.7	J	9.8	6.9	mg/Kg	1	☼	8015B	Total/NA
C29-C32	10		9.8	6.9	mg/Kg	1	☼	8015B	Total/NA
C33-C36	8.3	J	9.8	6.9	mg/Kg	1	☼	8015B	Total/NA
C6-C44	43		9.8	6.9	mg/Kg	1	☼	8015B	Total/NA
2,4'-DDE	1.7	J p	2.0	0.83	ug/Kg	1		8081A	Total/NA
4,4'-DDD	5.8		0.99	0.24	ug/Kg	1		8081A	Total/NA
4,4'-DDE	9.5		5.0	0.83	ug/Kg	5		8081A	Total/NA
4,4'-DDT	2.3	p	0.99	0.30	ug/Kg	1		8081A	Total/NA
Chlordane	14		9.9	0.67	ug/Kg	1		8081A	Total/NA
Aroclor-1254	76		19	2.2	ug/Kg	1	☼	8082	Total/NA
Aroclor-1260	120	F1	19	4.5	ug/Kg	1	☼	8082	Total/NA
Chromium	26.0		3.78	0.568	mg/Kg	20	☼	6020	Total/NA
Copper	90.9		1.89	0.509	mg/Kg	20	☼	6020	Total/NA
Lead	54.7		1.89	0.407	mg/Kg	20	☼	6020	Total/NA
Nickel	8.08		1.89	0.511	mg/Kg	20	☼	6020	Total/NA
Zinc	329		9.46	8.73	mg/Kg	20	☼	6020	Total/NA
Mercury	0.100	J	0.166	0.0117	mg/Kg	1	☼	7471A	Total/NA
Carbon, Total Organic	38900		965	335	mg/Kg	1	☼	9060A	Total/NA
Clay(less than 0.00391 mm)	16.11		0.01	0.01	%	1		D4464	Total/NA
Fine Sand (0.125 to 0.25mm)	4.88		0.01	0.01	%	1		D4464	Total/NA
Silt (0.00391 to 0.0625mm)	66.90		0.01	0.01	%	1		D4464	Total/NA
Total Silt and Clay (0 to 0.0626mm)	83.01		0.01	0.01	%	1		D4464	Total/NA
Very Fine Sand (0.0625 to 0.125 mm)	12.11		0.01	0.01	%	1		D4464	Total/NA

Client Sample ID: SED-006

Lab Sample ID: 570-27181-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acenaphthene	0.011	J	0.034	0.0017	mg/Kg	2	☼	8270C SIM	Total/NA
Anthracene	0.049		0.034	0.0023	mg/Kg	2	☼	8270C SIM	Total/NA
1,2-Benzanthracene	0.22	F2 F1	0.034	0.0037	mg/Kg	2	☼	8270C SIM	Total/NA
Benzo[a]pyrene	0.19	F2	0.034	0.0046	mg/Kg	2	☼	8270C SIM	Total/NA
3,4-Benzofluoranthene	0.20	F2	0.034	0.0049	mg/Kg	2	☼	8270C SIM	Total/NA
Benzo[k]fluoranthene	0.16	F2	0.034	0.0054	mg/Kg	2	☼	8270C SIM	Total/NA
1,12-Benzoperylene	0.10		0.034	0.0049	mg/Kg	2	☼	8270C SIM	Total/NA
Chrysene	0.25	F2 F1	0.034	0.0026	mg/Kg	2	☼	8270C SIM	Total/NA
Dibenz(a,h)anthracene	0.031	J	0.034	0.0036	mg/Kg	2	☼	8270C SIM	Total/NA
Fluoranthene	0.49	F2 F1	0.034	0.0032	mg/Kg	2	☼	8270C SIM	Total/NA
Fluorene	0.011	J F2	0.034	0.0028	mg/Kg	2	☼	8270C SIM	Total/NA
Indeno[1,2,3-cd]pyrene	0.072		0.034	0.0042	mg/Kg	2	☼	8270C SIM	Total/NA
1-Methylnaphthalene	0.013	J	0.034	0.0024	mg/Kg	2	☼	8270C SIM	Total/NA
2-Methylnaphthalene	0.0064	J	0.034	0.0024	mg/Kg	2	☼	8270C SIM	Total/NA
Naphthalene	0.0066	J	0.034	0.0026	mg/Kg	2	☼	8270C SIM	Total/NA
Phenanthrene	0.20	F2 F1	0.034	0.0028	mg/Kg	2	☼	8270C SIM	Total/NA
Pyrene	0.47	F2 F1	0.034	0.0025	mg/Kg	2	☼	8270C SIM	Total/NA
C21-C22	6.2	J	8.2	5.8	mg/Kg	1	☼	8015B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: SED-006 (Continued)

Lab Sample ID: 570-27181-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
C23-C24	11		8.2	5.8	mg/Kg	1	☼	8015B	Total/NA
C25-C28	32		8.2	5.8	mg/Kg	1	☼	8015B	Total/NA
C29-C32	35		8.2	5.8	mg/Kg	1	☼	8015B	Total/NA
C33-C36	29		8.2	5.8	mg/Kg	1	☼	8015B	Total/NA
C37-C40	17		8.2	5.8	mg/Kg	1	☼	8015B	Total/NA
C41-C44	11		8.2	5.8	mg/Kg	1	☼	8015B	Total/NA
C6-C44	160		8.2	5.8	mg/Kg	1	☼	8015B	Total/NA
2,4'-DDD	1.2	p	0.98	0.14	ug/Kg	1		8081A	Total/NA
2,4'-DDE	4.1	p	2.0	0.82	ug/Kg	1		8081A	Total/NA
4,4'-DDD	15	p	4.9	1.2	ug/Kg	5		8081A	Total/NA
4,4'-DDE	22		4.9	0.82	ug/Kg	5		8081A	Total/NA
4,4'-DDT	12	p	4.9	1.5	ug/Kg	5		8081A	Total/NA
Chlordane	65		9.8	0.67	ug/Kg	1		8081A	Total/NA
Aroclor-1254	81		17	1.9	ug/Kg	1	☼	8082	Total/NA
Aroclor-1260	71		17	3.9	ug/Kg	1	☼	8082	Total/NA
Cadmium	1.26	J	1.68	0.758	mg/Kg	20	☼	6020	Total/NA
Chromium	24.4		3.37	0.505	mg/Kg	20	☼	6020	Total/NA
Copper	68.8		1.68	0.453	mg/Kg	20	☼	6020	Total/NA
Lead	48.7		1.68	0.362	mg/Kg	20	☼	6020	Total/NA
Nickel	10.1		1.68	0.455	mg/Kg	20	☼	6020	Total/NA
Zinc	479		8.42	7.77	mg/Kg	20	☼	6020	Total/NA
Mercury	0.0468	J	0.147	0.0104	mg/Kg	1	☼	7471A	Total/NA
Carbon, Total Organic	30700		854	297	mg/Kg	1	☼	9060A	Total/NA
Clay(less than 0.00391 mm)	4.48		0.01	0.01	%	1		D4464	Total/NA
Coarse Sand (0.5mm to 1mm)	17.06		0.01	0.01	%	1		D4464	Total/NA
Fine Sand (0.125 to 0.25mm)	17.59		0.01	0.01	%	1		D4464	Total/NA
Medium Sand (0.25 to 0.5 mm)	19.04		0.01	0.01	%	1		D4464	Total/NA
Silt (0.00391 to 0.0625mm)	32.62		0.01	0.01	%	1		D4464	Total/NA
Total Silt and Clay (0 to 0.0626mm)	37.10		0.01	0.01	%	1		D4464	Total/NA
Very Fine Sand (0.0625 to 0.125 mm)	9.22		0.01	0.01	%	1		D4464	Total/NA

Client Sample ID: SE-D-007

Lab Sample ID: 570-27181-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acenaphthene	0.0019	J	0.018	0.00089	mg/Kg	1	☼	8270C SIM	Total/NA
Anthracene	0.010	J	0.018	0.0012	mg/Kg	1	☼	8270C SIM	Total/NA
1,2-Benzanthracene	0.047		0.018	0.0019	mg/Kg	1	☼	8270C SIM	Total/NA
Benzo[a]pyrene	0.053		0.018	0.0024	mg/Kg	1	☼	8270C SIM	Total/NA
3,4-Benzofluoranthene	0.068		0.018	0.0025	mg/Kg	1	☼	8270C SIM	Total/NA
Benzo[k]fluoranthene	0.073		0.018	0.0028	mg/Kg	1	☼	8270C SIM	Total/NA
1,12-Benzoperylene	0.037		0.018	0.0026	mg/Kg	1	☼	8270C SIM	Total/NA
Chrysene	0.10		0.018	0.0014	mg/Kg	1	☼	8270C SIM	Total/NA
Dibenz(a,h)anthracene	0.0095	J	0.018	0.0019	mg/Kg	1	☼	8270C SIM	Total/NA
Fluoranthene	0.12		0.018	0.0017	mg/Kg	1	☼	8270C SIM	Total/NA
Fluorene	0.019		0.018	0.0015	mg/Kg	1	☼	8270C SIM	Total/NA
Indeno[1,2,3-cd]pyrene	0.023		0.018	0.0022	mg/Kg	1	☼	8270C SIM	Total/NA
1-Methylnaphthalene	0.0026	J	0.018	0.0013	mg/Kg	1	☼	8270C SIM	Total/NA
2-Methylnaphthalene	0.0054	J	0.018	0.0013	mg/Kg	1	☼	8270C SIM	Total/NA
Naphthalene	0.0056	J	0.018	0.0014	mg/Kg	1	☼	8270C SIM	Total/NA
Phenanthrene	0.044		0.018	0.0015	mg/Kg	1	☼	8270C SIM	Total/NA
Pyrene	0.14		0.018	0.0013	mg/Kg	1	☼	8270C SIM	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: SE-D-007 (Continued)

Lab Sample ID: 570-27181-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
C21-C22	8.4		8.4	6.0	mg/Kg	1	☼	8015B	Total/NA
C23-C24	8.2	J	8.4	6.0	mg/Kg	1	☼	8015B	Total/NA
C25-C28	23		8.4	6.0	mg/Kg	1	☼	8015B	Total/NA
C29-C32	24		8.4	6.0	mg/Kg	1	☼	8015B	Total/NA
C33-C36	20		8.4	6.0	mg/Kg	1	☼	8015B	Total/NA
C37-C40	13		8.4	6.0	mg/Kg	1	☼	8015B	Total/NA
C41-C44	9.2		8.4	6.0	mg/Kg	1	☼	8015B	Total/NA
C6-C44	120		8.4	6.0	mg/Kg	1	☼	8015B	Total/NA
4,4'-DDD	4.8		0.99	0.24	ug/Kg	1		8081A	Total/NA
4,4'-DDE	6.9	p	0.99	0.17	ug/Kg	1		8081A	Total/NA
4,4'-DDT	1.3	p	0.99	0.30	ug/Kg	1		8081A	Total/NA
Chlordane	12		9.9	0.67	ug/Kg	1		8081A	Total/NA
Aroclor-1254	68		17	2.0	ug/Kg	1	☼	8082	Total/NA
Aroclor-1260	100		17	4.1	ug/Kg	1	☼	8082	Total/NA
Cadmium	0.862	J	1.78	0.803	mg/Kg	20	☼	6020	Total/NA
Chromium	12.1		3.57	0.535	mg/Kg	20	☼	6020	Total/NA
Copper	46.6		1.78	0.480	mg/Kg	20	☼	6020	Total/NA
Lead	35.6		1.78	0.384	mg/Kg	20	☼	6020	Total/NA
Nickel	9.07		1.78	0.482	mg/Kg	20	☼	6020	Total/NA
Zinc	292		8.92	8.24	mg/Kg	20	☼	6020	Total/NA
Mercury	0.0516	J	0.145	0.0102	mg/Kg	1	☼	7471A	Total/NA
Carbon, Total Organic	22600		883	307	mg/Kg	1	☼	9060A	Total/NA
Clay(less than 0.00391 mm)	12.62		0.01	0.01	%	1		D4464	Total/NA
Fine Sand (0.125 to 0.25mm)	11.36		0.01	0.01	%	1		D4464	Total/NA
Medium Sand (0.25 to 0.5 mm)	0.01		0.01	0.01	%	1		D4464	Total/NA
Silt (0.00391 to 0.0625mm)	63.45		0.01	0.01	%	1		D4464	Total/NA
Total Silt and Clay (0 to 0.0626mm)	76.07		0.01	0.01	%	1		D4464	Total/NA
Very Fine Sand (0.0625 to 0.125 mm)	12.56		0.01	0.01	%	1		D4464	Total/NA

This Detection Summary does not include radiochemical test results.

Method: 8270C SIM - PAHs (GC/MS SIM)

Client Sample ID: SED-004
Date Collected: 04/30/20 16:10
Date Received: 05/01/20 13:56

Lab Sample ID: 570-27181-1
Matrix: Solid

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	0.0045	J	0.035	0.0018	mg/Kg	☼	05/05/20 21:50	05/11/20 21:07	2
Acenaphthylene	ND		0.035	0.030	mg/Kg	☼	05/05/20 21:50	05/11/20 21:07	2
Anthracene	0.031	J	0.035	0.0023	mg/Kg	☼	05/05/20 21:50	05/11/20 21:07	2
1,2-Benzanthracene	0.097		0.035	0.0030	mg/Kg	☼	05/05/20 21:50	05/11/20 21:07	2
Benzo[a]pyrene	0.13		0.035	0.0047	mg/Kg	☼	05/05/20 21:50	05/11/20 21:07	2
3,4-Benzofluoranthene	0.15		0.035	0.0050	mg/Kg	☼	05/05/20 21:50	05/11/20 21:07	2
Benzo[k]fluoranthene	0.11		0.035	0.0056	mg/Kg	☼	05/05/20 21:50	05/11/20 21:07	2
1,12-Benzoperylene	0.12		0.035	0.0051	mg/Kg	☼	05/05/20 21:50	05/11/20 21:07	2
Chrysene	0.22		0.035	0.0027	mg/Kg	☼	05/05/20 21:50	05/11/20 21:07	2
Dibenz(a,h)anthracene	0.032	J	0.035	0.0037	mg/Kg	☼	05/05/20 21:50	05/11/20 21:07	2
Fluoranthene	0.20		0.035	0.0034	mg/Kg	☼	05/05/20 21:50	05/11/20 21:07	2
Fluorene	0.0054	J	0.035	0.0029	mg/Kg	☼	05/05/20 21:50	05/11/20 21:07	2
Indeno[1,2,3-cd]pyrene	0.060		0.035	0.0043	mg/Kg	☼	05/05/20 21:50	05/11/20 21:07	2
1-Methylnaphthalene	0.0092	J	0.035	0.0025	mg/Kg	☼	05/05/20 21:50	05/11/20 21:07	2
2-Methylnaphthalene	0.015	J	0.035	0.0025	mg/Kg	☼	05/05/20 21:50	05/11/20 21:07	2
Naphthalene	0.015	J	0.035	0.0027	mg/Kg	☼	05/05/20 21:50	05/11/20 21:07	2
Phenanthrene	0.088		0.035	0.0029	mg/Kg	☼	05/05/20 21:50	05/11/20 21:07	2
Pyrene	0.23		0.035	0.0026	mg/Kg	☼	05/05/20 21:50	05/11/20 21:07	2

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*79*		*22 - 130*	*05/05/20 21:50*	*05/11/20 21:07*	*2*
Nitrobenzene-d5 (Surr)	*48*		*20 - 145*	*05/05/20 21:50*	*05/11/20 21:07*	*2*
p-Terphenyl-d14 (Surr)	*85*		*33 - 147*	*05/05/20 21:50*	*05/11/20 21:07*	*2*

Client Sample ID: SED-005
Date Collected: 04/30/20 14:30
Date Received: 05/01/20 13:56

Lab Sample ID: 570-27181-2
Matrix: Solid

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	0.0046	J	0.038	0.0019	mg/Kg	☼	05/05/20 21:50	05/11/20 21:31	2
Acenaphthylene	ND		0.038	0.032	mg/Kg	☼	05/05/20 21:50	05/11/20 21:31	2
Anthracene	0.027	J	0.038	0.0025	mg/Kg	☼	05/05/20 21:50	05/11/20 21:31	2
1,2-Benzanthracene	0.090		0.038	0.0042	mg/Kg	☼	05/05/20 21:50	05/11/20 21:31	2
Benzo[a]pyrene	0.12		0.038	0.0051	mg/Kg	☼	05/05/20 21:50	05/11/20 21:31	2
3,4-Benzofluoranthene	0.15		0.038	0.0055	mg/Kg	☼	05/05/20 21:50	05/11/20 21:31	2
Benzo[k]fluoranthene	0.14		0.038	0.0061	mg/Kg	☼	05/05/20 21:50	05/11/20 21:31	2
1,12-Benzoperylene	0.097		0.038	0.0055	mg/Kg	☼	05/05/20 21:50	05/11/20 21:31	2
Chrysene	0.21		0.038	0.0029	mg/Kg	☼	05/05/20 21:50	05/11/20 21:31	2
Dibenz(a,h)anthracene	0.027	J	0.038	0.0040	mg/Kg	☼	05/05/20 21:50	05/11/20 21:31	2
Fluoranthene	0.21		0.038	0.0037	mg/Kg	☼	05/05/20 21:50	05/11/20 21:31	2
Fluorene	0.0046	J	0.038	0.0032	mg/Kg	☼	05/05/20 21:50	05/11/20 21:31	2
Indeno[1,2,3-cd]pyrene	0.055		0.038	0.0047	mg/Kg	☼	05/05/20 21:50	05/11/20 21:31	2
1-Methylnaphthalene	0.0054	J	0.038	0.0027	mg/Kg	☼	05/05/20 21:50	05/11/20 21:31	2
2-Methylnaphthalene	0.012	J	0.038	0.0027	mg/Kg	☼	05/05/20 21:50	05/11/20 21:31	2
Naphthalene	0.015	J	0.038	0.0029	mg/Kg	☼	05/05/20 21:50	05/11/20 21:31	2
Phenanthrene	0.079		0.038	0.0032	mg/Kg	☼	05/05/20 21:50	05/11/20 21:31	2
Pyrene	0.26		0.038	0.0028	mg/Kg	☼	05/05/20 21:50	05/11/20 21:31	2

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*81*		*22 - 130*	*05/05/20 21:50*	*05/11/20 21:31*	*2*
Nitrobenzene-d5 (Surr)	*48*		*20 - 145*	*05/05/20 21:50*	*05/11/20 21:31*	*2*

Method: 8270C SIM - PAHs (GC/MS SIM) (Continued)

Client Sample ID: SED-005
Date Collected: 04/30/20 14:30
Date Received: 05/01/20 13:56

Lab Sample ID: 570-27181-2
Matrix: Solid

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
p-Terphenyl-d14 (Surr)	84		33 - 147	05/05/20 21:50	05/11/20 21:31	2

Client Sample ID: SED-006
Date Collected: 04/30/20 12:30
Date Received: 05/01/20 13:56

Lab Sample ID: 570-27181-3
Matrix: Solid

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	**0.011**	**J**	0.034	0.0017	mg/Kg	☼	05/05/20 21:50	05/11/20 21:55	2
Acenaphthylene	ND		0.034	0.029	mg/Kg	☼	05/05/20 21:50	05/11/20 21:55	2
Anthracene	**0.049**		0.034	0.0023	mg/Kg	☼	05/05/20 21:50	05/11/20 21:55	2
1,2-Benzanthracene	**0.22**	**F2 F1**	0.034	0.0037	mg/Kg	☼	05/05/20 21:50	05/11/20 21:55	2
Benzo[a]pyrene	**0.19**	**F2**	0.034	0.0046	mg/Kg	☼	05/05/20 21:50	05/11/20 21:55	2
3,4-Benzofluoranthene	**0.20**	**F2**	0.034	0.0049	mg/Kg	☼	05/05/20 21:50	05/11/20 21:55	2
Benzo[k]fluoranthene	**0.16**	**F2**	0.034	0.0054	mg/Kg	☼	05/05/20 21:50	05/11/20 21:55	2
1,12-Benzoperylene	**0.10**		0.034	0.0049	mg/Kg	☼	05/05/20 21:50	05/11/20 21:55	2
Chrysene	**0.25**	**F2 F1**	0.034	0.0026	mg/Kg	☼	05/05/20 21:50	05/11/20 21:55	2
Dibenz(a,h)anthracene	**0.031**	**J**	0.034	0.0036	mg/Kg	☼	05/05/20 21:50	05/11/20 21:55	2
Fluoranthene	**0.49**	**F2 F1**	0.034	0.0032	mg/Kg	☼	05/05/20 21:50	05/11/20 21:55	2
Fluorene	**0.011**	**J F2**	0.034	0.0028	mg/Kg	☼	05/05/20 21:50	05/11/20 21:55	2
Indeno[1,2,3-cd]pyrene	**0.072**		0.034	0.0042	mg/Kg	☼	05/05/20 21:50	05/11/20 21:55	2
1-Methylnaphthalene	**0.013**	**J**	0.034	0.0024	mg/Kg	☼	05/05/20 21:50	05/11/20 21:55	2
2-Methylnaphthalene	**0.0064**	**J**	0.034	0.0024	mg/Kg	☼	05/05/20 21:50	05/11/20 21:55	2
Naphthalene	**0.0066**	**J**	0.034	0.0026	mg/Kg	☼	05/05/20 21:50	05/11/20 21:55	2
Phenanthrene	**0.20**	**F2 F1**	0.034	0.0028	mg/Kg	☼	05/05/20 21:50	05/11/20 21:55	2
Pyrene	**0.47**	**F2 F1**	0.034	0.0025	mg/Kg	☼	05/05/20 21:50	05/11/20 21:55	2

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
2-Fluorobiphenyl (Surr)	55		22 - 130	05/05/20 21:50	05/11/20 21:55	2
Nitrobenzene-d5 (Surr)	22		20 - 145	05/05/20 21:50	05/11/20 21:55	2
p-Terphenyl-d14 (Surr)	58		33 - 147	05/05/20 21:50	05/11/20 21:55	2

Client Sample ID: SE-D-007
Date Collected: 04/30/20 11:04
Date Received: 05/01/20 13:56

Lab Sample ID: 570-27181-4
Matrix: Solid

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	**0.0019**	**J**	0.018	0.00089	mg/Kg	☼	05/05/20 21:50	05/07/20 17:57	1
Acenaphthylene	ND		0.018	0.015	mg/Kg	☼	05/05/20 21:50	05/07/20 17:57	1
Anthracene	**0.010**	**J**	0.018	0.0012	mg/Kg	☼	05/05/20 21:50	05/07/20 17:57	1
1,2-Benzanthracene	**0.047**		0.018	0.0019	mg/Kg	☼	05/05/20 21:50	05/07/20 17:57	1
Benzo[a]pyrene	**0.053**		0.018	0.0024	mg/Kg	☼	05/05/20 21:50	05/07/20 17:57	1
3,4-Benzofluoranthene	**0.068**		0.018	0.0025	mg/Kg	☼	05/05/20 21:50	05/07/20 17:57	1
Benzo[k]fluoranthene	**0.073**		0.018	0.0028	mg/Kg	☼	05/05/20 21:50	05/07/20 17:57	1
1,12-Benzoperylene	**0.037**		0.018	0.0026	mg/Kg	☼	05/05/20 21:50	05/07/20 17:57	1
Chrysene	**0.10**		0.018	0.0014	mg/Kg	☼	05/05/20 21:50	05/07/20 17:57	1
Dibenz(a,h)anthracene	**0.0095**	**J**	0.018	0.0019	mg/Kg	☼	05/05/20 21:50	05/07/20 17:57	1
Fluoranthene	**0.12**		0.018	0.0017	mg/Kg	☼	05/05/20 21:50	05/07/20 17:57	1
Fluorene	**0.019**		0.018	0.0015	mg/Kg	☼	05/05/20 21:50	05/07/20 17:57	1
Indeno[1,2,3-cd]pyrene	**0.023**		0.018	0.0022	mg/Kg	☼	05/05/20 21:50	05/07/20 17:57	1
1-Methylnaphthalene	**0.0026**	**J**	0.018	0.0013	mg/Kg	☼	05/05/20 21:50	05/07/20 17:57	1
2-Methylnaphthalene	**0.0054**	**J**	0.018	0.0013	mg/Kg	☼	05/05/20 21:50	05/07/20 17:57	1
Naphthalene	**0.0056**	**J**	0.018	0.0014	mg/Kg	☼	05/05/20 21:50	05/07/20 17:57	1

Method: 8270C SIM - PAHs (GC/MS SIM) (Continued)

Client Sample ID: SE-D-007
Date Collected: 04/30/20 11:04
Date Received: 05/01/20 13:56

Lab Sample ID: 570-27181-4
Matrix: Solid

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phenanthrene	0.044		0.018	0.0015	mg/Kg	☼	05/05/20 21:50	05/07/20 17:57	1
Pyrene	0.14		0.018	0.0013	mg/Kg	☼	05/05/20 21:50	05/07/20 17:57	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*62*		*22 - 130*	*05/05/20 21:50*	*05/07/20 17:57*	*1*
Nitrobenzene-d5 (Surr)	*40*		*20 - 145*	*05/05/20 21:50*	*05/07/20 17:57*	*1*
p-Terphenyl-d14 (Surr)	*88*		*33 - 147*	*05/05/20 21:50*	*05/07/20 17:57*	*1*

Method: Organotins SIM - Organotins (GC/MS SIM)

Client Sample ID: SED-004
Date Collected: 04/30/20 16:10
Date Received: 05/01/20 13:56

Lab Sample ID: 570-27181-1
Matrix: Solid

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tributyltin	ND		5.1	2.5	ug/Kg	☼	05/04/20 09:52	05/05/20 20:17	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tripentyltin	*77*		*27 - 135*	*05/04/20 09:52*	*05/05/20 20:17*	*1*

Client Sample ID: SED-005
Date Collected: 04/30/20 14:30
Date Received: 05/01/20 13:56

Lab Sample ID: 570-27181-2
Matrix: Solid

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tributyltin	ND		5.6	2.8	ug/Kg	☼	05/04/20 09:52	05/05/20 20:35	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tripentyltin	*77*		*27 - 135*	*05/04/20 09:52*	*05/05/20 20:35*	*1*

Client Sample ID: SED-006
Date Collected: 04/30/20 12:30
Date Received: 05/01/20 13:56

Lab Sample ID: 570-27181-3
Matrix: Solid

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tributyltin	ND		5.1	2.5	ug/Kg	☼	05/04/20 09:52	05/05/20 20:53	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tripentyltin	*62*		*27 - 135*	*05/04/20 09:52*	*05/05/20 20:53*	*1*

Client Sample ID: SE-D-007
Date Collected: 04/30/20 11:04
Date Received: 05/01/20 13:56

Lab Sample ID: 570-27181-4
Matrix: Solid

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tributyltin	ND		5.2	2.6	ug/Kg	☼	05/04/20 09:52	05/05/20 21:10	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tripentyltin	*77*		*27 - 135*	*05/04/20 09:52*	*05/05/20 21:10*	*1*

Method: 8015B - Diesel Range Organics (DRO) (GC)

Client Sample ID: SED-004
Date Collected: 04/30/20 16:10
Date Received: 05/01/20 13:56

Lab Sample ID: 570-27181-1
Matrix: Solid

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C6 as C6	ND		9.1	6.5	mg/Kg	☼	05/06/20 15:46	05/07/20 02:10	1
C7 as C7	ND		9.1	6.5	mg/Kg	☼	05/06/20 15:46	05/07/20 02:10	1
C8 as C8	ND		9.1	6.5	mg/Kg	☼	05/06/20 15:46	05/07/20 02:10	1
C9-C10	ND		9.1	6.5	mg/Kg	☼	05/06/20 15:46	05/07/20 02:10	1
C11-C12	ND		9.1	6.5	mg/Kg	☼	05/06/20 15:46	05/07/20 02:10	1
C13-C14	ND		9.1	6.5	mg/Kg	☼	05/06/20 15:46	05/07/20 02:10	1
C15-C16	ND		9.1	6.5	mg/Kg	☼	05/06/20 15:46	05/07/20 02:10	1
C17-C18	ND		9.1	6.5	mg/Kg	☼	05/06/20 15:46	05/07/20 02:10	1
C19-C20	ND		9.1	6.5	mg/Kg	☼	05/06/20 15:46	05/07/20 02:10	1
C21-C22	ND		9.1	6.5	mg/Kg	☼	05/06/20 15:46	05/07/20 02:10	1
C23-C24	ND		9.1	6.5	mg/Kg	☼	05/06/20 15:46	05/07/20 02:10	1
C25-C28	ND		9.1	6.5	mg/Kg	☼	05/06/20 15:46	05/07/20 02:10	1
C29-C32	ND		9.1	6.5	mg/Kg	☼	05/06/20 15:46	05/07/20 02:10	1
C33-C36	ND		9.1	6.5	mg/Kg	☼	05/06/20 15:46	05/07/20 02:10	1
C37-C40	ND		9.1	6.5	mg/Kg	☼	05/06/20 15:46	05/07/20 02:10	1
C41-C44	ND		9.1	6.5	mg/Kg	☼	05/06/20 15:46	05/07/20 02:10	1
C6-C44	**23**		9.1	6.5	mg/Kg	☼	05/06/20 15:46	05/07/20 02:10	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
n-Octacosane (Surr)	*107*		*61 - 145*	*05/06/20 15:46*	*05/07/20 02:10*	*1*

Client Sample ID: SED-005
Date Collected: 04/30/20 14:30
Date Received: 05/01/20 13:56

Lab Sample ID: 570-27181-2
Matrix: Solid

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C6 as C6	ND		9.8	6.9	mg/Kg	☼	05/06/20 15:46	05/07/20 02:30	1
C7 as C7	ND		9.8	6.9	mg/Kg	☼	05/06/20 15:46	05/07/20 02:30	1
C8 as C8	ND		9.8	6.9	mg/Kg	☼	05/06/20 15:46	05/07/20 02:30	1
C9-C10	ND		9.8	6.9	mg/Kg	☼	05/06/20 15:46	05/07/20 02:30	1
C11-C12	ND		9.8	6.9	mg/Kg	☼	05/06/20 15:46	05/07/20 02:30	1
C13-C14	ND		9.8	6.9	mg/Kg	☼	05/06/20 15:46	05/07/20 02:30	1
C15-C16	ND		9.8	6.9	mg/Kg	☼	05/06/20 15:46	05/07/20 02:30	1
C17-C18	ND		9.8	6.9	mg/Kg	☼	05/06/20 15:46	05/07/20 02:30	1
C19-C20	ND		9.8	6.9	mg/Kg	☼	05/06/20 15:46	05/07/20 02:30	1
C21-C22	ND		9.8	6.9	mg/Kg	☼	05/06/20 15:46	05/07/20 02:30	1
C23-C24	ND		9.8	6.9	mg/Kg	☼	05/06/20 15:46	05/07/20 02:30	1
C25-C28	**8.7**	**J**	9.8	6.9	mg/Kg	☼	05/06/20 15:46	05/07/20 02:30	1
C29-C32	**10**		9.8	6.9	mg/Kg	☼	05/06/20 15:46	05/07/20 02:30	1
C33-C36	**8.3**	**J**	9.8	6.9	mg/Kg	☼	05/06/20 15:46	05/07/20 02:30	1
C37-C40	ND		9.8	6.9	mg/Kg	☼	05/06/20 15:46	05/07/20 02:30	1
C41-C44	ND		9.8	6.9	mg/Kg	☼	05/06/20 15:46	05/07/20 02:30	1
C6-C44	**43**		9.8	6.9	mg/Kg	☼	05/06/20 15:46	05/07/20 02:30	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
n-Octacosane (Surr)	*96*		*61 - 145*	*05/06/20 15:46*	*05/07/20 02:30*	*1*

Method: 8015B - Diesel Range Organics (DRO) (GC)

Client Sample ID: SED-006
Date Collected: 04/30/20 12:30
Date Received: 05/01/20 13:56

Lab Sample ID: 570-27181-3
Matrix: Solid

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C6 as C6	ND		8.2	5.8	mg/Kg	☼	05/06/20 15:46	05/07/20 02:50	1
C7 as C7	ND		8.2	5.8	mg/Kg	☼	05/06/20 15:46	05/07/20 02:50	1
C8 as C8	ND		8.2	5.8	mg/Kg	☼	05/06/20 15:46	05/07/20 02:50	1
C9-C10	ND		8.2	5.8	mg/Kg	☼	05/06/20 15:46	05/07/20 02:50	1
C11-C12	ND		8.2	5.8	mg/Kg	☼	05/06/20 15:46	05/07/20 02:50	1
C13-C14	ND		8.2	5.8	mg/Kg	☼	05/06/20 15:46	05/07/20 02:50	1
C15-C16	ND		8.2	5.8	mg/Kg	☼	05/06/20 15:46	05/07/20 02:50	1
C17-C18	ND		8.2	5.8	mg/Kg	☼	05/06/20 15:46	05/07/20 02:50	1
C19-C20	ND		8.2	5.8	mg/Kg	☼	05/06/20 15:46	05/07/20 02:50	1
C21-C22	**6.2**	J	8.2	5.8	mg/Kg	☼	05/06/20 15:46	05/07/20 02:50	1
C23-C24	**11**		8.2	5.8	mg/Kg	☼	05/06/20 15:46	05/07/20 02:50	1
C25-C28	**32**		8.2	5.8	mg/Kg	☼	05/06/20 15:46	05/07/20 02:50	1
C29-C32	**35**		8.2	5.8	mg/Kg	☼	05/06/20 15:46	05/07/20 02:50	1
C33-C36	**29**		8.2	5.8	mg/Kg	☼	05/06/20 15:46	05/07/20 02:50	1
C37-C40	**17**		8.2	5.8	mg/Kg	☼	05/06/20 15:46	05/07/20 02:50	1
C41-C44	**11**		8.2	5.8	mg/Kg	☼	05/06/20 15:46	05/07/20 02:50	1
C6-C44	**160**		8.2	5.8	mg/Kg	☼	05/06/20 15:46	05/07/20 02:50	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
n-Octacosane (Surr)	*100*		*61 - 145*	*05/06/20 15:46*	*05/07/20 02:50*	*1*

Client Sample ID: SE-D-007
Date Collected: 04/30/20 11:04
Date Received: 05/01/20 13:56

Lab Sample ID: 570-27181-4
Matrix: Solid

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C6 as C6	ND		8.4	6.0	mg/Kg	☼	05/06/20 15:46	05/07/20 03:11	1
C7 as C7	ND		8.4	6.0	mg/Kg	☼	05/06/20 15:46	05/07/20 03:11	1
C8 as C8	ND		8.4	6.0	mg/Kg	☼	05/06/20 15:46	05/07/20 03:11	1
C9-C10	ND		8.4	6.0	mg/Kg	☼	05/06/20 15:46	05/07/20 03:11	1
C11-C12	ND		8.4	6.0	mg/Kg	☼	05/06/20 15:46	05/07/20 03:11	1
C13-C14	ND		8.4	6.0	mg/Kg	☼	05/06/20 15:46	05/07/20 03:11	1
C15-C16	ND		8.4	6.0	mg/Kg	☼	05/06/20 15:46	05/07/20 03:11	1
C17-C18	ND		8.4	6.0	mg/Kg	☼	05/06/20 15:46	05/07/20 03:11	1
C19-C20	ND		8.4	6.0	mg/Kg	☼	05/06/20 15:46	05/07/20 03:11	1
C21-C22	**8.4**		8.4	6.0	mg/Kg	☼	05/06/20 15:46	05/07/20 03:11	1
C23-C24	**8.2**	J	8.4	6.0	mg/Kg	☼	05/06/20 15:46	05/07/20 03:11	1
C25-C28	**23**		8.4	6.0	mg/Kg	☼	05/06/20 15:46	05/07/20 03:11	1
C29-C32	**24**		8.4	6.0	mg/Kg	☼	05/06/20 15:46	05/07/20 03:11	1
C33-C36	**20**		8.4	6.0	mg/Kg	☼	05/06/20 15:46	05/07/20 03:11	1
C37-C40	**13**		8.4	6.0	mg/Kg	☼	05/06/20 15:46	05/07/20 03:11	1
C41-C44	**9.2**		8.4	6.0	mg/Kg	☼	05/06/20 15:46	05/07/20 03:11	1
C6-C44	**120**		8.4	6.0	mg/Kg	☼	05/06/20 15:46	05/07/20 03:11	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
n-Octacosane (Surr)	*91*		*61 - 145*	*05/06/20 15:46*	*05/07/20 03:11*	*1*

Method: 8081A - Organochlorine Pesticides (GC)

Client Sample ID: SED-004
Date Collected: 04/30/20 16:10
Date Received: 05/01/20 13:56

Lab Sample ID: 570-27181-1
Matrix: Solid

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4'-DDD	**0.78**	**J p**	0.99	0.15	ug/Kg		05/11/20 20:49	05/14/20 08:47	1
2,4'-DDE	ND		2.0	0.83	ug/Kg		05/11/20 20:49	05/14/20 08:47	1
2,4'-DDT	ND		0.99	0.13	ug/Kg		05/11/20 20:49	05/14/20 08:47	1
4,4'-DDD	**8.4**		0.99	0.24	ug/Kg		05/11/20 20:49	05/14/20 08:47	1
4,4'-DDE	**11**		5.0	0.83	ug/Kg		05/11/20 20:49	05/14/20 06:24	5
4,4'-DDT	**1.7**	**p**	0.99	0.30	ug/Kg		05/11/20 20:49	05/14/20 08:47	1
Chlordane	**13**	**p**	9.9	0.67	ug/Kg		05/11/20 20:49	05/14/20 08:47	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*50*		*25 - 126*	*05/11/20 20:49*	*05/14/20 06:24*	*5*
Tetrachloro-m-xylene	*76*	*p*	*25 - 126*	*05/11/20 20:49*	*05/14/20 08:47*	*1*
DCB Decachlorobiphenyl (Surr)	*110*		*20 - 155*	*05/11/20 20:49*	*05/14/20 06:24*	*5*
DCB Decachlorobiphenyl (Surr)	*100*	*p*	*20 - 155*	*05/11/20 20:49*	*05/14/20 08:47*	*1*

Client Sample ID: SED-005
Date Collected: 04/30/20 14:30
Date Received: 05/01/20 13:56

Lab Sample ID: 570-27181-2
Matrix: Solid

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4'-DDD	ND		0.99	0.15	ug/Kg		05/11/20 20:49	05/14/20 09:01	1
2,4'-DDE	**1.7**	**J p**	2.0	0.83	ug/Kg		05/11/20 20:49	05/14/20 09:01	1
2,4'-DDT	ND		0.99	0.13	ug/Kg		05/11/20 20:49	05/14/20 09:01	1
4,4'-DDD	**5.8**		0.99	0.24	ug/Kg		05/11/20 20:49	05/14/20 09:01	1
4,4'-DDE	**9.5**		5.0	0.83	ug/Kg		05/11/20 20:49	05/14/20 06:38	5
4,4'-DDT	**2.3**	**p**	0.99	0.30	ug/Kg		05/11/20 20:49	05/14/20 09:01	1
Chlordane	**14**		9.9	0.67	ug/Kg		05/11/20 20:49	05/14/20 09:01	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*38*		*25 - 126*	*05/11/20 20:49*	*05/14/20 06:38*	*5*
Tetrachloro-m-xylene	*81*	*p*	*25 - 126*	*05/11/20 20:49*	*05/14/20 09:01*	*1*
DCB Decachlorobiphenyl (Surr)	*94*		*20 - 155*	*05/11/20 20:49*	*05/14/20 06:38*	*5*
DCB Decachlorobiphenyl (Surr)	*82*	*p*	*20 - 155*	*05/11/20 20:49*	*05/14/20 09:01*	*1*

Client Sample ID: SED-006
Date Collected: 04/30/20 12:30
Date Received: 05/01/20 13:56

Lab Sample ID: 570-27181-3
Matrix: Solid

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4'-DDD	**1.2**	**p**	0.98	0.14	ug/Kg		05/11/20 20:49	05/14/20 09:15	1
2,4'-DDE	**4.1**	**p**	2.0	0.82	ug/Kg		05/11/20 20:49	05/14/20 09:15	1
2,4'-DDT	ND		0.98	0.13	ug/Kg		05/11/20 20:49	05/14/20 09:15	1
4,4'-DDD	**15**	**p**	4.9	1.2	ug/Kg		05/11/20 20:49	05/14/20 06:52	5
4,4'-DDE	**22**		4.9	0.82	ug/Kg		05/11/20 20:49	05/14/20 06:52	5
4,4'-DDT	**12**	**p**	4.9	1.5	ug/Kg		05/11/20 20:49	05/14/20 06:52	5
Chlordane	**65**		9.8	0.67	ug/Kg		05/11/20 20:49	05/14/20 09:15	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*46*		*25 - 126*	*05/11/20 20:49*	*05/14/20 06:52*	*5*
Tetrachloro-m-xylene	*85*	*p*	*25 - 126*	*05/11/20 20:49*	*05/14/20 09:15*	*1*
DCB Decachlorobiphenyl (Surr)	*2392*	*X*	*20 - 155*	*05/11/20 20:49*	*05/14/20 06:52*	*5*
DCB Decachlorobiphenyl (Surr)	*3034*	*X*	*20 - 155*	*05/11/20 20:49*	*05/14/20 09:15*	*1*

Method: 8081A - Organochlorine Pesticides (GC)

Client Sample ID: SE-D-007
Date Collected: 04/30/20 11:04
Date Received: 05/01/20 13:56

Lab Sample ID: 570-27181-4
Matrix: Solid

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4'-DDD	ND		0.99	0.15	ug/Kg		05/11/20 20:49	05/14/20 09:29	1
2,4'-DDE	ND		2.0	0.83	ug/Kg		05/11/20 20:49	05/14/20 09:29	1
2,4'-DDT	ND		0.99	0.13	ug/Kg		05/11/20 20:49	05/14/20 09:29	1
4,4'-DDD	**4.8**		0.99	0.24	ug/Kg		05/11/20 20:49	05/14/20 09:29	1
4,4'-DDE	**6.9**	**p**	0.99	0.17	ug/Kg		05/11/20 20:49	05/14/20 09:29	1
4,4'-DDT	**1.3**	**p**	0.99	0.30	ug/Kg		05/11/20 20:49	05/14/20 09:29	1
Chlordane	**12**		9.9	0.67	ug/Kg		05/11/20 20:49	05/14/20 09:29	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*101*	*p*	*25 - 126*	*05/11/20 20:49*	*05/14/20 09:29*	*1*
DCB Decachlorobiphenyl (Surr)	*87*	*p*	*20 - 155*	*05/11/20 20:49*	*05/14/20 09:29*	*1*

Method: 8082 - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Client Sample ID: SED-004
Date Collected: 04/30/20 16:10
Date Received: 05/01/20 13:56

Lab Sample ID: 570-27181-1
Matrix: Solid

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor-1016	ND		17	3.5	ug/Kg	☼	05/05/20 14:07	05/11/20 14:04	1
Aroclor-1221	ND		17	11	ug/Kg	☼	05/05/20 14:07	05/11/20 14:04	1
Aroclor-1232	ND		17	4.1	ug/Kg	☼	05/05/20 14:07	05/11/20 14:04	1
Aroclor-1242	ND		17	2.9	ug/Kg	☼	05/05/20 14:07	05/11/20 14:04	1
Aroclor-1248	ND		17	2.1	ug/Kg	☼	05/05/20 14:07	05/11/20 14:04	1
Aroclor-1254	**49**		17	2.0	ug/Kg	☼	05/05/20 14:07	05/11/20 14:04	1
Aroclor-1260	ND		17	4.1	ug/Kg	☼	05/05/20 14:07	05/11/20 14:04	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl (Surr)	*78*		*20 - 155*	*05/05/20 14:07*	*05/11/20 14:04*	*1*
Tetrachloro-m-xylene (Surr)	*67*		*25 - 126*	*05/05/20 14:07*	*05/11/20 14:04*	*1*

Client Sample ID: SED-005
Date Collected: 04/30/20 14:30
Date Received: 05/01/20 13:56

Lab Sample ID: 570-27181-2
Matrix: Solid

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor-1016	ND	F2 F1	19	3.9	ug/Kg	☼	05/05/20 14:07	05/11/20 12:34	1
Aroclor-1221	ND		19	12	ug/Kg	☼	05/05/20 14:07	05/11/20 12:34	1
Aroclor-1232	ND		19	4.5	ug/Kg	☼	05/05/20 14:07	05/11/20 12:34	1
Aroclor-1242	ND		19	3.1	ug/Kg	☼	05/05/20 14:07	05/11/20 12:34	1
Aroclor-1248	ND		19	2.3	ug/Kg	☼	05/05/20 14:07	05/11/20 12:34	1
Aroclor-1254	**76**		19	2.2	ug/Kg	☼	05/05/20 14:07	05/11/20 12:34	1
Aroclor-1260	**120**	**F1**	19	4.5	ug/Kg	☼	05/05/20 14:07	05/11/20 12:34	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl (Surr)	*136*		*20 - 155*	*05/05/20 14:07*	*05/11/20 12:34*	*1*
Tetrachloro-m-xylene (Surr)	*92*		*25 - 126*	*05/05/20 14:07*	*05/11/20 12:34*	*1*

Client Sample ID: SED-006
Date Collected: 04/30/20 12:30
Date Received: 05/01/20 13:56

Lab Sample ID: 570-27181-3
Matrix: Solid

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor-1016	ND		17	3.4	ug/Kg	☼	05/05/20 21:57	05/11/20 13:28	1
Aroclor-1221	ND		17	11	ug/Kg	☼	05/05/20 21:57	05/11/20 13:28	1
Aroclor-1232	ND		17	3.9	ug/Kg	☼	05/05/20 21:57	05/11/20 13:28	1
Aroclor-1242	ND		17	2.8	ug/Kg	☼	05/05/20 21:57	05/11/20 13:28	1
Aroclor-1248	ND		17	2.0	ug/Kg	☼	05/05/20 21:57	05/11/20 13:28	1
Aroclor-1254	**81**		17	1.9	ug/Kg	☼	05/05/20 21:57	05/11/20 13:28	1
Aroclor-1260	**71**		17	3.9	ug/Kg	☼	05/05/20 21:57	05/11/20 13:28	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl (Surr)	*90*		*20 - 155*	*05/05/20 21:57*	*05/11/20 13:28*	*1*
Tetrachloro-m-xylene (Surr)	*72*		*25 - 126*	*05/05/20 21:57*	*05/11/20 13:28*	*1*

Client Sample ID: SE-D-007
Date Collected: 04/30/20 11:04
Date Received: 05/01/20 13:56

Lab Sample ID: 570-27181-4
Matrix: Solid

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor-1016	ND		17	3.6	ug/Kg	☼	05/05/20 21:57	05/11/20 13:46	1
Aroclor-1221	ND		17	11	ug/Kg	☼	05/05/20 21:57	05/11/20 13:46	1
Aroclor-1232	ND		17	4.1	ug/Kg	☼	05/05/20 21:57	05/11/20 13:46	1

Method: 8082 - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

Client Sample ID: SE-D-007
Date Collected: 04/30/20 11:04
Date Received: 05/01/20 13:56

Lab Sample ID: 570-27181-4
Matrix: Solid

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor-1242	ND		17	2.9	ug/Kg	☼	05/05/20 21:57	05/11/20 13:46	1
Aroclor-1248	ND		17	2.1	ug/Kg	☼	05/05/20 21:57	05/11/20 13:46	1
Aroclor-1254	**68**		17	2.0	ug/Kg	☼	05/05/20 21:57	05/11/20 13:46	1
Aroclor-1260	**100**		17	4.1	ug/Kg	☼	05/05/20 21:57	05/11/20 13:46	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl (Surr)	*128*		*20 - 155*	*05/05/20 21:57*	*05/11/20 13:46*	*1*
Tetrachloro-m-xylene (Surr)	*88*		*25 - 126*	*05/05/20 21:57*	*05/11/20 13:46*	*1*

Method: 6020 - Metals (ICP/MS)

Client Sample ID: SED-004
Date Collected: 04/30/20 16:10
Date Received: 05/01/20 13:56

Lab Sample ID: 570-27181-1
Matrix: Solid

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		1.79	0.806	mg/Kg	☼	05/13/20 16:54	05/14/20 09:17	20
Chromium	26.8		3.58	0.537	mg/Kg	☼	05/13/20 16:54	05/14/20 09:17	20
Copper	77.8		1.79	0.482	mg/Kg	☼	05/13/20 16:54	05/14/20 09:17	20
Lead	201		1.79	0.385	mg/Kg	☼	05/13/20 16:54	05/14/20 09:17	20
Nickel	7.64		1.79	0.484	mg/Kg	☼	05/13/20 16:54	05/14/20 09:17	20
Zinc	304		8.96	8.27	mg/Kg	☼	05/13/20 16:54	05/14/20 09:17	20

Client Sample ID: SED-005
Date Collected: 04/30/20 14:30
Date Received: 05/01/20 13:56

Lab Sample ID: 570-27181-2
Matrix: Solid

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		1.89	0.851	mg/Kg	☼	05/13/20 16:54	05/14/20 09:20	20
Chromium	26.0		3.78	0.568	mg/Kg	☼	05/13/20 16:54	05/14/20 09:20	20
Copper	90.9		1.89	0.509	mg/Kg	☼	05/13/20 16:54	05/14/20 09:20	20
Lead	54.7		1.89	0.407	mg/Kg	☼	05/13/20 16:54	05/14/20 09:20	20
Nickel	8.08		1.89	0.511	mg/Kg	☼	05/13/20 16:54	05/14/20 09:20	20
Zinc	329		9.46	8.73	mg/Kg	☼	05/13/20 16:54	05/14/20 09:20	20

Client Sample ID: SED-006
Date Collected: 04/30/20 12:30
Date Received: 05/01/20 13:56

Lab Sample ID: 570-27181-3
Matrix: Solid

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	1.26	J	1.68	0.758	mg/Kg	☼	05/13/20 16:54	05/14/20 09:22	20
Chromium	24.4		3.37	0.505	mg/Kg	☼	05/13/20 16:54	05/14/20 09:22	20
Copper	68.8		1.68	0.453	mg/Kg	☼	05/13/20 16:54	05/14/20 09:22	20
Lead	48.7		1.68	0.362	mg/Kg	☼	05/13/20 16:54	05/14/20 09:22	20
Nickel	10.1		1.68	0.455	mg/Kg	☼	05/13/20 16:54	05/14/20 09:22	20
Zinc	479		8.42	7.77	mg/Kg	☼	05/13/20 16:54	05/14/20 09:22	20

Client Sample ID: SE-D-007
Date Collected: 04/30/20 11:04
Date Received: 05/01/20 13:56

Lab Sample ID: 570-27181-4
Matrix: Solid

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	0.862	J	1.78	0.803	mg/Kg	☼	05/13/20 16:54	05/14/20 09:25	20
Chromium	12.1		3.57	0.535	mg/Kg	☼	05/13/20 16:54	05/14/20 09:25	20
Copper	46.6		1.78	0.480	mg/Kg	☼	05/13/20 16:54	05/14/20 09:25	20
Lead	35.6		1.78	0.384	mg/Kg	☼	05/13/20 16:54	05/14/20 09:25	20
Nickel	9.07		1.78	0.482	mg/Kg	☼	05/13/20 16:54	05/14/20 09:25	20
Zinc	292		8.92	8.24	mg/Kg	☼	05/13/20 16:54	05/14/20 09:25	20

Method: 7471A - Mercury (CVAA)

Client Sample ID: SED-004
Date Collected: 04/30/20 16:10
Date Received: 05/01/20 13:56

Lab Sample ID: 570-27181-1
Matrix: Solid

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.137	J	0.149	0.0105	mg/Kg	☼	05/13/20 08:10	05/13/20 13:42	1

Client Sample ID: SED-005
Date Collected: 04/30/20 14:30
Date Received: 05/01/20 13:56

Lab Sample ID: 570-27181-2
Matrix: Solid

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.100	J	0.166	0.0117	mg/Kg	☼	05/13/20 08:10	05/13/20 13:44	1

Client Sample ID: SED-006
Date Collected: 04/30/20 12:30
Date Received: 05/01/20 13:56

Lab Sample ID: 570-27181-3
Matrix: Solid

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.0468	J	0.147	0.0104	mg/Kg	☼	05/13/20 08:10	05/13/20 13:45	1

Client Sample ID: SE-D-007
Date Collected: 04/30/20 11:04
Date Received: 05/01/20 13:56

Lab Sample ID: 570-27181-4
Matrix: Solid

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.0516	J	0.145	0.0102	mg/Kg	☼	05/13/20 08:10	05/13/20 13:47	1

General Chemistry

Client Sample ID: SED-004
Date Collected: 04/30/20 16:10
Date Received: 05/01/20 13:56

Lab Sample ID: 570-27181-1
Matrix: Solid

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon, Total Organic	31800		878	305	mg/Kg	☼		05/21/20 18:40	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	43.0		0.1	0.1	%			05/02/20 11:03	1

Client Sample ID: SED-005
Date Collected: 04/30/20 14:30
Date Received: 05/01/20 13:56

Lab Sample ID: 570-27181-2
Matrix: Solid

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon, Total Organic	38900		965	335	mg/Kg	☼		05/21/20 18:40	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	48.2		0.1	0.1	%			05/02/20 11:03	1

Client Sample ID: SED-006
Date Collected: 04/30/20 12:30
Date Received: 05/01/20 13:56

Lab Sample ID: 570-27181-3
Matrix: Solid

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon, Total Organic	30700		854	297	mg/Kg	☼		05/21/20 18:40	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	41.5		0.1	0.1	%			05/02/20 11:03	1

Client Sample ID: SE-D-007
Date Collected: 04/30/20 11:04
Date Received: 05/01/20 13:56

Lab Sample ID: 570-27181-4
Matrix: Solid

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon, Total Organic	22600		883	307	mg/Kg	☼		05/21/20 18:40	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	43.4		0.1	0.1	%			05/02/20 11:03	1

Method: D4464 - Particle Size Distribution of Catalytic Material (Laser light scattering)

Client Sample ID: SED-004
Date Collected: 04/30/20 16:10
Date Received: 05/01/20 13:56

Lab Sample ID: 570-27181-1
Matrix: Solid

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Clay(less than 0.00391 mm)	**12.19**		0.01	0.01	%			05/11/20 15:29	1
Coarse Sand (0.5mm to 1mm)	ND		0.01	0.01	%			05/11/20 15:29	1
Fine Sand (0.125 to 0.25mm)	**10.10**		0.01	0.01	%			05/11/20 15:29	1
Gravel (greater than 2 mm)	ND		0.01	0.01	%			05/11/20 15:29	1
Medium Sand (0.25 to 0.5 mm)	ND		0.01	0.01	%			05/11/20 15:29	1
Silt (0.00391 to 0.0625mm)	**63.76**		0.01	0.01	%			05/11/20 15:29	1
Total Silt and Clay (0 to 0.0626mm)	**75.95**		0.01	0.01	%			05/11/20 15:29	1
Very Coarse Sand (1 to 2mm)	ND		0.01	0.01	%			05/11/20 15:29	1
Very Fine Sand (0.0625 to 0.125 mm)	**13.94**		0.01	0.01	%			05/11/20 15:29	1

Client Sample ID: SED-005
Date Collected: 04/30/20 14:30
Date Received: 05/01/20 13:56

Lab Sample ID: 570-27181-2
Matrix: Solid

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Clay(less than 0.00391 mm)	**16.11**		0.01	0.01	%			05/11/20 15:37	1
Coarse Sand (0.5mm to 1mm)	ND		0.01	0.01	%			05/11/20 15:37	1
Fine Sand (0.125 to 0.25mm)	**4.88**		0.01	0.01	%			05/11/20 15:37	1
Gravel (greater than 2 mm)	ND		0.01	0.01	%			05/11/20 15:37	1
Medium Sand (0.25 to 0.5 mm)	ND		0.01	0.01	%			05/11/20 15:37	1
Silt (0.00391 to 0.0625mm)	**66.90**		0.01	0.01	%			05/11/20 15:37	1
Total Silt and Clay (0 to 0.0626mm)	**83.01**		0.01	0.01	%			05/11/20 15:37	1
Very Coarse Sand (1 to 2mm)	ND		0.01	0.01	%			05/11/20 15:37	1
Very Fine Sand (0.0625 to 0.125 mm)	**12.11**		0.01	0.01	%			05/11/20 15:37	1

Client Sample ID: SED-006
Date Collected: 04/30/20 12:30
Date Received: 05/01/20 13:56

Lab Sample ID: 570-27181-3
Matrix: Solid

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Clay(less than 0.00391 mm)	**4.48**		0.01	0.01	%			05/11/20 15:46	1
Coarse Sand (0.5mm to 1mm)	**17.06**		0.01	0.01	%			05/11/20 15:46	1
Fine Sand (0.125 to 0.25mm)	**17.59**		0.01	0.01	%			05/11/20 15:46	1
Gravel (greater than 2 mm)	ND		0.01	0.01	%			05/11/20 15:46	1
Medium Sand (0.25 to 0.5 mm)	**19.04**		0.01	0.01	%			05/11/20 15:46	1
Silt (0.00391 to 0.0625mm)	**32.62**		0.01	0.01	%			05/11/20 15:46	1
Total Silt and Clay (0 to 0.0626mm)	**37.10**		0.01	0.01	%			05/11/20 15:46	1
Very Coarse Sand (1 to 2mm)	ND		0.01	0.01	%			05/11/20 15:46	1
Very Fine Sand (0.0625 to 0.125 mm)	**9.22**		0.01	0.01	%			05/11/20 15:46	1

Client Sample ID: SE-D-007
Date Collected: 04/30/20 11:04
Date Received: 05/01/20 13:56

Lab Sample ID: 570-27181-4
Matrix: Solid

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Clay(less than 0.00391 mm)	**12.62**		0.01	0.01	%			05/11/20 15:54	1
Coarse Sand (0.5mm to 1mm)	ND		0.01	0.01	%			05/11/20 15:54	1
Fine Sand (0.125 to 0.25mm)	**11.36**		0.01	0.01	%			05/11/20 15:54	1
Gravel (greater than 2 mm)	ND		0.01	0.01	%			05/11/20 15:54	1

Method: D4464 - Particle Size Distribution of Catalytic Material (Laser light scattering) (Continued)

Client Sample ID: SE-D-007
Date Collected: 04/30/20 11:04
Date Received: 05/01/20 13:56

Lab Sample ID: 570-27181-4
Matrix: Solid

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Medium Sand (0.25 to 0.5 mm)	**0.01**		0.01	0.01	%			05/11/20 15:54	1
Silt (0.00391 to 0.0625mm)	**63.45**		0.01	0.01	%			05/11/20 15:54	1
Total Silt and Clay (0 to 0.0626mm)	**76.07**		0.01	0.01	%			05/11/20 15:54	1
Very Coarse Sand (1 to 2mm)	ND		0.01	0.01	%			05/11/20 15:54	1
Very Fine Sand (0.0625 to 0.125 mm)	**12.56**		0.01	0.01	%			05/11/20 15:54	1

PARTICLE SIZE SUMMARY

(ASTM D422 / D4464M)

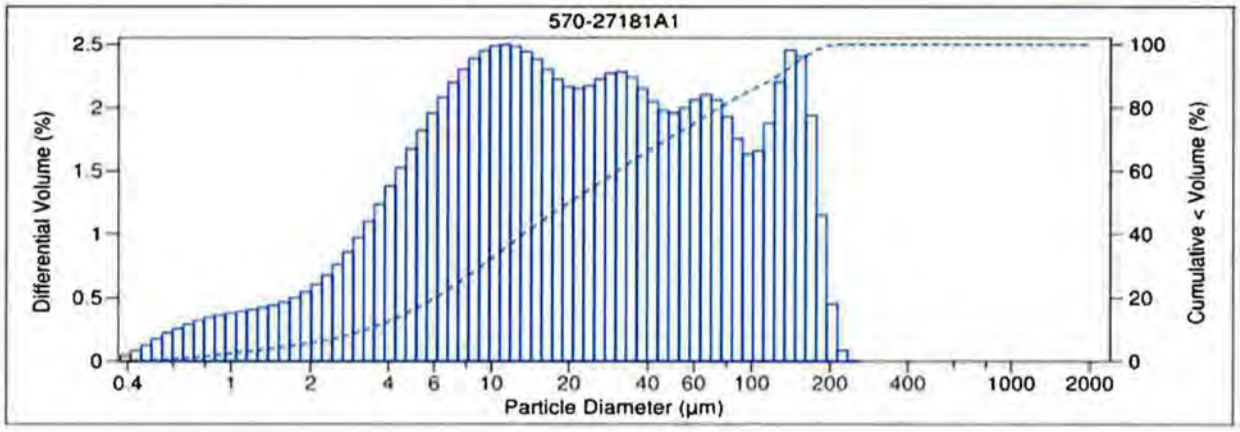
WGR Southwest, Inc.

Date Sampled:	04/30/20
Date Received:	05/01/20
Work Order No:	570-27181
Date Analyzed:	05/11/20
Method:	ASTM D4464M

Project:

Sample ID	Depth ft	Description	Mean Grain Size mm
SED-004		Silt	0.042

Particle Size Distribution, wt by percent								
Total Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt	Clay	Total Silt & Clay
0.00	0.00	0.00	0.00	10.10	13.94	63.76	12.19	75.95



V 3.0

PARTICLE SIZE SUMMARY

(ASTM D422 / D4464M)

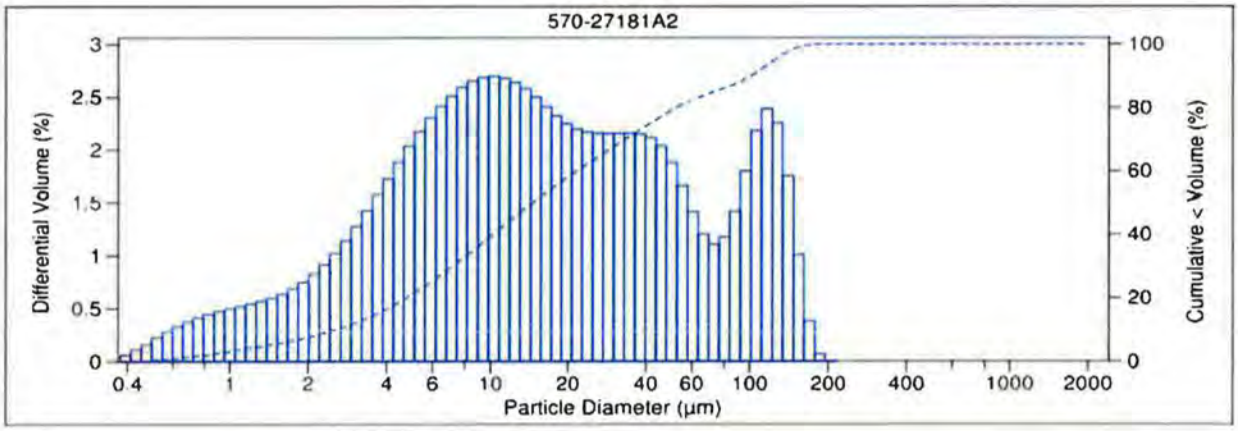
WGR Southwest, Inc.

Date Sampled:	04/30/20
Date Received:	05/01/20
Work Order No:	570-27181
Date Analyzed:	05/11/20
Method:	ASTM D4464M

Project:

Sample ID	Depth ft	Description	Mean Grain Size mm
SED-005		Silt	0.032

Particle Size Distribution, wt by percent								
Total Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt	Clay	Total Silt & Clay
0.00	0.00	0.00	0.00	4.88	12.11	66.90	16.11	83.01



V3.0

PARTICLE SIZE SUMMARY

(ASTM D422 / D4464M)

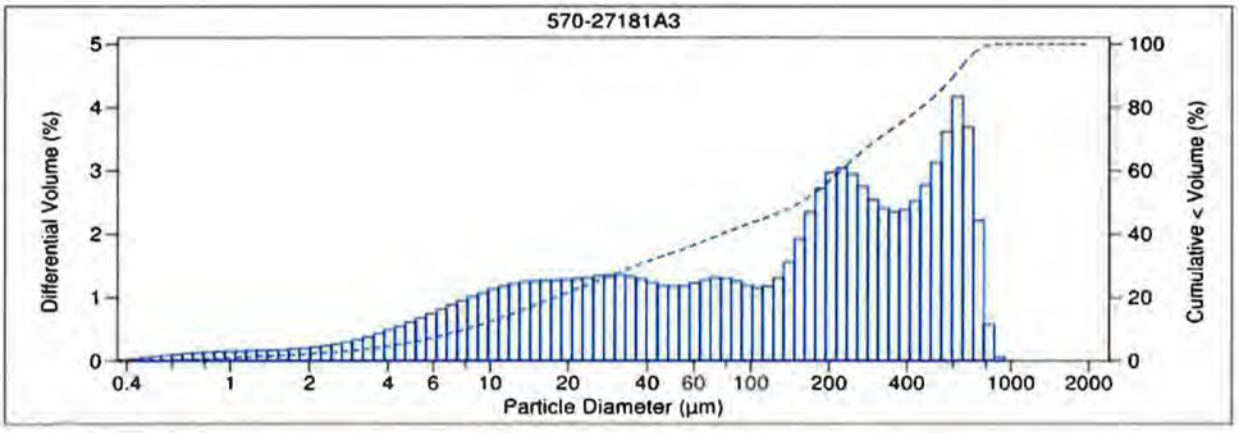
WGR Southwest, Inc.

Date Sampled:	04/30/20
Date Received:	05/01/20
Work Order No:	570-27181
Date Analyzed:	05/11/20
Method:	ASTM D4464M

Project:

Sample ID	Depth ft	Description	Mean Grain Size mm
SED-006		Fine Sand	0.226

Particle Size Distribution, wt by percent								
Total Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt	Clay	Total Silt & Clay
0.00	0.00	17.06	19.04	17.59	9.22	32.62	4.48	37.10



V 3.0

PARTICLE SIZE SUMMARY

(ASTM D422 / D4464M)

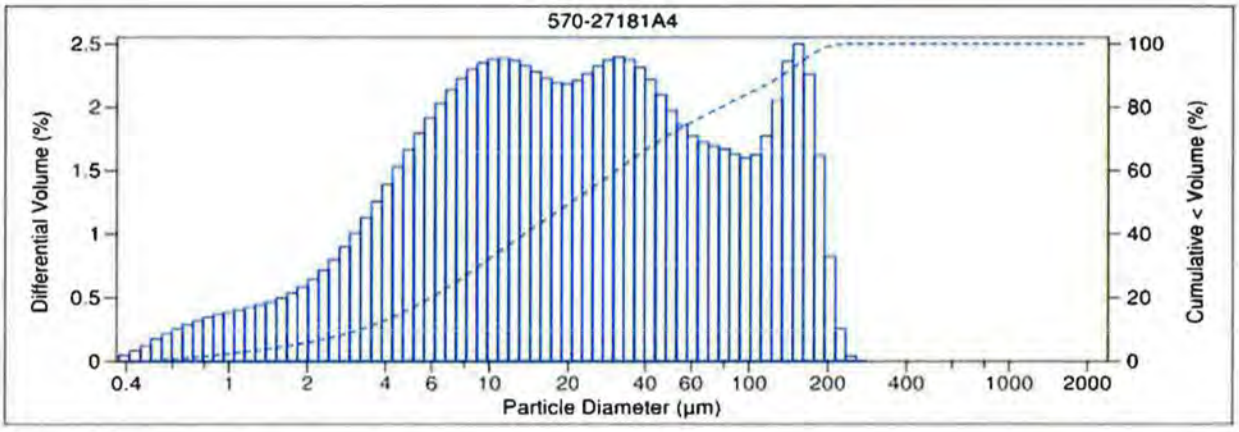
WGR Southwest, Inc.

Date Sampled:	04/30/20
Date Received:	05/01/20
Work Order No:	570-27181
Date Analyzed:	05/11/20
Method:	ASTM D4464M

Project:

Sample ID	Depth ft	Description	Mean Grain Size mm
SED-007		Silt	0.043

Particle Size Distribution, wt by percent								
Total Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt	Clay	Total Silt & Clay
0.00	0.00	0.00	0.01	11.36	12.56	63.45	12.62	76.07



V3.0

Surrogate Summary

Client: WGR Southwest Inc
Project/Site: WGR - Tesoro LA Refinery

Job ID: 570-27181-1

Method: 8270C SIM - PAHs (GC/MS SIM)

Matrix: Solid

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)		
Lab Sample ID	Client Sample ID	FBP (22-130)	NBZ (20-145)	TPHd14 (33-147)
570-27181-1	SED-004	79	48	85
570-27181-2	SED-005	81	48	84
570-27181-3	SED-006	55	22	58
570-27181-3 MS	SED-006	76	46	78
570-27181-3 MSD	SED-006	76	45	84
570-27181-4	SE-D-007	62	40	88
LCS 570-67217/2-A	Lab Control Sample	66	51	75
LCSD 570-67217/3-A	Lab Control Sample Dup	74	54	82
MB 570-67217/1-A	Method Blank	55	34	67

Surrogate Legend

FBP = 2-Fluorobiphenyl (Surr)
NBZ = Nitrobenzene-d5 (Surr)
TPHd14 = p-Terphenyl-d14 (Surr)

Method: Organotins SIM - Organotins (GC/MS SIM)

Matrix: Solid

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)
Lab Sample ID	Client Sample ID	TPTT (27-135)
570-27181-1	SED-004	77
570-27181-2	SED-005	77
570-27181-3	SED-006	62
570-27181-4	SE-D-007	77
660-101903-A-1-A MS	Matrix Spike	50
660-101903-A-1-B MSD	Matrix Spike Duplicate	61
LCS 570-66829/2-A	Lab Control Sample	84
LCSD 570-66829/3-A	Lab Control Sample Dup	68
MB 570-66829/1-A	Method Blank	90

Surrogate Legend

TPTT = Tripentyltin

Method: 8015B - Diesel Range Organics (DRO) (GC)

Matrix: Solid

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)
Lab Sample ID	Client Sample ID	OTCSN1 (61-145)
570-27181-1	SED-004	107
570-27181-2	SED-005	96
570-27181-3	SED-006	100
570-27181-4	SE-D-007	91
570-27190-A-1-J MS	Matrix Spike	98
570-27190-A-1-K MSD	Matrix Spike Duplicate	97
LCS 570-67364/2-A	Lab Control Sample	103
LCSD 570-67364/3-A	Lab Control Sample Dup	95
MB 570-67364/1-A	Method Blank	96

Surrogate Legend

OTCSN = n-Octacosane (Surr)

Surrogate Summary

Client: WGR Southwest Inc
Project/Site: WGR - Tesoro LA Refinery

Job ID: 570-27181-1

Method: 8081A - Organochlorine Pesticides (GC)

Matrix: Solid

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)	
Lab Sample ID	Client Sample ID	TCX1 (25-126)	DCB1 (20-155)
570-27181-1	SED-004	50	110
570-27181-1	SED-004	76 p	100 p
570-27181-1 MS	SED-004	75 p	134
570-27181-1 MSD	SED-004	83 p	307 X
570-27181-2	SED-005	38	94
570-27181-2	SED-005	81 p	82 p
570-27181-3	SED-006	46	2392 X
570-27181-3	SED-006	85 p	3034 X
570-27181-4	SE-D-007	101 p	87 p

Surrogate Legend

TCX = Tetrachloro-m-xylene

DCB = DCB Decachlorobiphenyl (Surr)

Method: 8082 - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Solid

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)	
Lab Sample ID	Client Sample ID	DCB1 (20-155)	TCX1 (25-126)
570-27181-1	SED-004	78	67
570-27181-2	SED-005	136	92
570-27181-2 MS	SED-005	144	118
570-27181-2 MSD	SED-005	139	119
570-27181-3	SED-006	90	72
570-27181-4	SE-D-007	128	88
LCS 570-67132/4-A	Lab Control Sample	72	53
LCSD 570-67132/5-A	Lab Control Sample Dup	77	54
MB 570-67132/1-A	Method Blank	93	83

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)

TCX = Tetrachloro-m-xylene (Surr)

Method: 8270C SIM - PAHs (GC/MS SIM)

Lab Sample ID: MB 570-67217/1-A
Matrix: Solid
Analysis Batch: 67642

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 67217

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	ND		0.010	0.00051	mg/Kg		05/05/20 21:50	05/07/20 14:44	1
Acenaphthylene	ND		0.010	0.0085	mg/Kg		05/05/20 21:50	05/07/20 14:44	1
Anthracene	ND		0.010	0.00067	mg/Kg		05/05/20 21:50	05/07/20 14:44	1
1,2-Benzanthracene	ND		0.010	0.0011	mg/Kg		05/05/20 21:50	05/07/20 14:44	1
Benzo[a]pyrene	ND		0.010	0.0014	mg/Kg		05/05/20 21:50	05/07/20 14:44	1
3,4-Benzofluoranthene	ND		0.010	0.0015	mg/Kg		05/05/20 21:50	05/07/20 14:44	1
Benzo[k]fluoranthene	ND		0.010	0.0016	mg/Kg		05/05/20 21:50	05/07/20 14:44	1
1,12-Benzoperylene	ND		0.010	0.0015	mg/Kg		05/05/20 21:50	05/07/20 14:44	1
Chrysene	ND		0.010	0.00078	mg/Kg		05/05/20 21:50	05/07/20 14:44	1
Dibenz(a,h)anthracene	ND		0.010	0.0011	mg/Kg		05/05/20 21:50	05/07/20 14:44	1
Fluoranthene	ND		0.010	0.00097	mg/Kg		05/05/20 21:50	05/07/20 14:44	1
Fluorene	ND		0.010	0.00084	mg/Kg		05/05/20 21:50	05/07/20 14:44	1
Indeno[1,2,3-cd]pyrene	ND		0.010	0.0012	mg/Kg		05/05/20 21:50	05/07/20 14:44	1
1-Methylnaphthalene	ND		0.010	0.00072	mg/Kg		05/05/20 21:50	05/07/20 14:44	1
2-Methylnaphthalene	ND		0.010	0.00072	mg/Kg		05/05/20 21:50	05/07/20 14:44	1
Naphthalene	ND		0.010	0.00078	mg/Kg		05/05/20 21:50	05/07/20 14:44	1
Phenanthrene	ND		0.010	0.00084	mg/Kg		05/05/20 21:50	05/07/20 14:44	1
Pyrene	ND		0.010	0.00075	mg/Kg		05/05/20 21:50	05/07/20 14:44	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*55*		*22 - 130*	*05/05/20 21:50*	*05/07/20 14:44*	*1*
Nitrobenzene-d5 (Surr)	*34*		*20 - 145*	*05/05/20 21:50*	*05/07/20 14:44*	*1*
p-Terphenyl-d14 (Surr)	*67*		*33 - 147*	*05/05/20 21:50*	*05/07/20 14:44*	*1*

Lab Sample ID: LCS 570-67217/2-A
Matrix: Solid
Analysis Batch: 67642

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 67217

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acenaphthene	0.100	0.06909		mg/Kg		69	53 - 125
Acenaphthylene	0.100	0.07078		mg/Kg		71	50 - 123
Anthracene	0.100	0.06420		mg/Kg		64	50 - 132
1,2-Benzanthracene	0.100	0.07612		mg/Kg		76	50 - 133
Benzo[a]pyrene	0.100	0.06694		mg/Kg		67	50 - 134
3,4-Benzofluoranthene	0.100	0.06620		mg/Kg		66	50 - 142
Benzo[k]fluoranthene	0.100	0.07592		mg/Kg		76	49 - 150
1,12-Benzoperylene	0.100	0.07130		mg/Kg		71	50 - 130
Chrysene	0.100	0.06962		mg/Kg		70	51 - 129
Dibenz(a,h)anthracene	0.100	0.06804		mg/Kg		68	50 - 133
Fluoranthene	0.100	0.07528		mg/Kg		75	55 - 127
Fluorene	0.100	0.07475		mg/Kg		75	55 - 127
Indeno[1,2,3-cd]pyrene	0.100	0.06777		mg/Kg		68	50 - 148
1-Methylnaphthalene	0.100	0.06269		mg/Kg		63	54 - 132
2-Methylnaphthalene	0.100	0.05840		mg/Kg		58	50 - 127
Naphthalene	0.100	0.05399		mg/Kg		54	51 - 129
Phenanthrene	0.100	0.06518		mg/Kg		65	50 - 122
Pyrene	0.100	0.06937		mg/Kg		69	50 - 134

Method: 8270C SIM - PAHs (GC/MS SIM) (Continued)

Lab Sample ID: LCS 570-67217/2-A
Matrix: Solid
Analysis Batch: 67642

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 67217

Surrogate	LCS %Recovery	LCS Qualifier	Limits
2-Fluorobiphenyl (Surr)	66		22 - 130
Nitrobenzene-d5 (Surr)	51		20 - 145
p-Terphenyl-d14 (Surr)	75		33 - 147

Lab Sample ID: LCSD 570-67217/3-A
Matrix: Solid
Analysis Batch: 67904

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 67217

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Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Acenaphthene	0.100	0.07590		mg/Kg		76	53 - 125	9	20
Acenaphthylene	0.100	0.07341		mg/Kg		73	50 - 123	4	20
Anthracene	0.100	0.06860		mg/Kg		69	50 - 132	7	20
1,2-Benzanthracene	0.100	0.08054		mg/Kg		81	50 - 133	6	20
Benzo[a]pyrene	0.100	0.07084		mg/Kg		71	50 - 134	6	20
3,4-Benzofluoranthene	0.100	0.07161		mg/Kg		72	50 - 142	8	20
Benzo[k]fluoranthene	0.100	0.07584		mg/Kg		76	49 - 150	0	20
1,12-Benzoperylene	0.100	0.07149		mg/Kg		71	50 - 130	0	20
Chrysene	0.100	0.06948		mg/Kg		69	51 - 129	0	20
Dibenz(a,h)anthracene	0.100	0.06938		mg/Kg		69	50 - 133	2	20
Fluoranthene	0.100	0.07834		mg/Kg		78	55 - 127	4	20
Fluorene	0.100	0.07768		mg/Kg		78	55 - 127	4	20
Indeno[1,2,3-cd]pyrene	0.100	0.06968		mg/Kg		70	50 - 148	3	20
1-Methylnaphthalene	0.100	0.06289		mg/Kg		63	54 - 132	0	20
2-Methylnaphthalene	0.100	0.06142		mg/Kg		61	50 - 127	5	20
Naphthalene	0.100	0.05926		mg/Kg		59	51 - 129	9	20
Phenanthrene	0.100	0.06862		mg/Kg		69	50 - 122	5	20
Pyrene	0.100	0.06700		mg/Kg		67	50 - 134	3	20

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
2-Fluorobiphenyl (Surr)	74		22 - 130
Nitrobenzene-d5 (Surr)	54		20 - 145
p-Terphenyl-d14 (Surr)	82		33 - 147

Lab Sample ID: 570-27181-3 MS
Matrix: Solid
Analysis Batch: 68220

Client Sample ID: SED-006
Prep Type: Total/NA
Prep Batch: 67217

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Acenaphthene	0.011	J	0.171	0.1032		mg/Kg	☼	54	29 - 137
Acenaphthylene	ND		0.171	0.1342		mg/Kg	☼	79	29 - 131
Anthracene	0.049		0.171	0.1485		mg/Kg	☼	58	26 - 134
1,2-Benzanthracene	0.22	F2 F1	0.171	0.2422	F1	mg/Kg	☼	13	24 - 150
Benzo[a]pyrene	0.19	F2	0.171	0.2535		mg/Kg	☼	35	29 - 149
3,4-Benzofluoranthene	0.20	F2	0.171	0.2939		mg/Kg	☼	57	21 - 153
Benzo[k]fluoranthene	0.16	F2	0.171	0.2611		mg/Kg	☼	61	28 - 148
1,12-Benzoperylene	0.10		0.171	0.2109		mg/Kg	☼	65	20 - 148
Chrysene	0.25	F2 F1	0.171	0.3260		mg/Kg	☼	44	25 - 145
Dibenz(a,h)anthracene	0.031	J	0.171	0.1443		mg/Kg	☼	66	20 - 132

Method: 8270C SIM - PAHs (GC/MS SIM) (Continued)

Lab Sample ID: 570-27181-3 MS
Matrix: Solid
Analysis Batch: 68220

Client Sample ID: SED-006
Prep Type: Total/NA
Prep Batch: 67217

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoranthene	0.49	F2 F1	0.171	0.4051	F1	mg/Kg	☼	-52	20 - 151
Fluorene	0.011	J F2	0.171	0.1427		mg/Kg	☼	77	36 - 132
Indeno[1,2,3-cd]pyrene	0.072		0.171	0.1856		mg/Kg	☼	66	20 - 154
1-Methylnaphthalene	0.013	J	0.171	0.08118		mg/Kg	☼	40	34 - 136
2-Methylnaphthalene	0.0064	J	0.171	0.07858		mg/Kg	☼	42	29 - 137
Naphthalene	0.0066	J	0.171	0.07912		mg/Kg	☼	42	20 - 150
Phenanthrene	0.20	F2 F1	0.171	0.2280	F1	mg/Kg	☼	19	20 - 144
Pyrene	0.47	F2 F1	0.171	0.4477	F1	mg/Kg	☼	-11	20 - 150

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
2-Fluorobiphenyl (Surr)	*76*		*22 - 130*
Nitrobenzene-d5 (Surr)	*46*		*20 - 145*
p-Terphenyl-d14 (Surr)	*78*		*33 - 147*

Lab Sample ID: 570-27181-3 MSD
Matrix: Solid
Analysis Batch: 68220

Client Sample ID: SED-006
Prep Type: Total/NA
Prep Batch: 67217

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Acenaphthene	0.011	J	0.168	0.1177		mg/Kg	☼	64	29 - 137	13	28
Acenaphthylene	ND		0.168	0.1398		mg/Kg	☼	83	29 - 131	4	32
Anthracene	0.049		0.168	0.1901		mg/Kg	☼	84	26 - 134	25	27
1,2-Benzanthracene	0.22	F2 F1	0.168	0.4634	F2	mg/Kg	☼	144	24 - 150	63	24
Benzo[a]pyrene	0.19	F2	0.168	0.4097	F2	mg/Kg	☼	128	29 - 149	47	22
3,4-Benzofluoranthene	0.20	F2	0.168	0.4335	F2	mg/Kg	☼	141	21 - 153	38	26
Benzo[k]fluoranthene	0.16	F2	0.168	0.3894	F2	mg/Kg	☼	138	28 - 148	39	26
1,12-Benzoperylene	0.10		0.168	0.2531		mg/Kg	☼	91	20 - 148	18	27
Chrysene	0.25	F2 F1	0.168	0.5681	F1 F2	mg/Kg	☼	189	25 - 145	54	28
Dibenz(a,h)anthracene	0.031	J	0.168	0.1753		mg/Kg	☼	86	20 - 132	19	26
Fluoranthene	0.49	F2 F1	0.168	0.7200	F2	mg/Kg	☼	134	20 - 151	56	26
Fluorene	0.011	J F2	0.168	0.1931	F2	mg/Kg	☼	108	36 - 132	30	27
Indeno[1,2,3-cd]pyrene	0.072		0.168	0.2371		mg/Kg	☼	98	20 - 154	24	25
1-Methylnaphthalene	0.013	J	0.168	0.08693		mg/Kg	☼	44	34 - 136	7	29
2-Methylnaphthalene	0.0064	J	0.168	0.08751		mg/Kg	☼	48	29 - 137	11	31
Naphthalene	0.0066	J	0.168	0.08187		mg/Kg	☼	45	20 - 150	3	33
Phenanthrene	0.20	F2 F1	0.168	0.4345	F2	mg/Kg	☼	142	20 - 144	62	27
Pyrene	0.47	F2 F1	0.168	0.7860	F1 F2	mg/Kg	☼	189	20 - 150	55	32

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2-Fluorobiphenyl (Surr)	*76*		*22 - 130*
Nitrobenzene-d5 (Surr)	*45*		*20 - 145*
p-Terphenyl-d14 (Surr)	*84*		*33 - 147*

Method: Organotins SIM - Organotins (GC/MS SIM)

Lab Sample ID: MB 570-66829/1-A
Matrix: Solid
Analysis Batch: 67134

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 66829

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tributyltin	ND		3.0	1.5	ug/Kg		05/04/20 09:52	05/05/20 17:51	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tripentyltin	*90*		*27 - 135*	*05/04/20 09:52*	*05/05/20 17:51*	*1*

Lab Sample ID: LCS 570-66829/2-A
Matrix: Solid
Analysis Batch: 67134

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 66829

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Tetrabutyltin	100	93.02		ug/Kg		93	40 - 142
Tributyltin	100	76.09		ug/Kg		76	33 - 147

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Tripentyltin	*84*		*27 - 135*

Lab Sample ID: LCSD 570-66829/3-A
Matrix: Solid
Analysis Batch: 67134

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 66829

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Tetrabutyltin	100	88.94		ug/Kg		89	40 - 142	4	20
Tributyltin	100	73.19		ug/Kg		73	33 - 147	4	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Tripentyltin	*68*		*27 - 135*

Lab Sample ID: 660-101903-A-1-A MS
Matrix: Solid
Analysis Batch: 67134

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 66829

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Tetrabutyltin	1.5	J	100	95.02		ug/Kg		94	33 - 129
Tributyltin	140		100	175.0		ug/Kg		35	34 - 142

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Tripentyltin	*50*		*27 - 135*

Lab Sample ID: 660-101903-A-1-B MSD
Matrix: Solid
Analysis Batch: 67134

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 66829

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Tetrabutyltin	1.5	J	99.0	68.43		ug/Kg		68	33 - 129	33	36
Tributyltin	140		99.0	181.0		ug/Kg		41	34 - 142	3	50

Method: Organotins SIM - Organotins (GC/MS SIM) (Continued)

Lab Sample ID: 660-101903-A-1-B MSD
Matrix: Solid
Analysis Batch: 67134

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 66829

Surrogate	MSD %Recovery	MSD Qualifier	Limits
Tripentyltin	61		27 - 135

Method: 8015B - Diesel Range Organics (DRO) (GC)

Lab Sample ID: MB 570-67364/1-A
Matrix: Solid
Analysis Batch: 67570

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 67364

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C6 as C6	ND		5.0	3.6	mg/Kg		05/06/20 13:07	05/07/20 12:39	1
C7 as C7	ND		5.0	3.6	mg/Kg		05/06/20 13:07	05/07/20 12:39	1
C8 as C8	ND		5.0	3.6	mg/Kg		05/06/20 13:07	05/07/20 12:39	1
C9-C10	ND		5.0	3.6	mg/Kg		05/06/20 13:07	05/07/20 12:39	1
C11-C12	ND		5.0	3.6	mg/Kg		05/06/20 13:07	05/07/20 12:39	1
C13-C14	ND		5.0	3.6	mg/Kg		05/06/20 13:07	05/07/20 12:39	1
C15-C16	ND		5.0	3.6	mg/Kg		05/06/20 13:07	05/07/20 12:39	1
C17-C18	ND		5.0	3.6	mg/Kg		05/06/20 13:07	05/07/20 12:39	1
C19-C20	ND		5.0	3.6	mg/Kg		05/06/20 13:07	05/07/20 12:39	1
C21-C22	ND		5.0	3.6	mg/Kg		05/06/20 13:07	05/07/20 12:39	1
C23-C24	ND		5.0	3.6	mg/Kg		05/06/20 13:07	05/07/20 12:39	1
C25-C28	ND		5.0	3.6	mg/Kg		05/06/20 13:07	05/07/20 12:39	1
C29-C32	ND		5.0	3.6	mg/Kg		05/06/20 13:07	05/07/20 12:39	1
C33-C36	ND		5.0	3.6	mg/Kg		05/06/20 13:07	05/07/20 12:39	1
C37-C40	ND		5.0	3.6	mg/Kg		05/06/20 13:07	05/07/20 12:39	1
C41-C44	ND		5.0	3.6	mg/Kg		05/06/20 13:07	05/07/20 12:39	1
C6-C44	ND		5.0	3.6	mg/Kg		05/06/20 13:07	05/07/20 12:39	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
n-Octacosane (Surr)	96		61 - 145	05/06/20 13:07	05/07/20 12:39	1

Lab Sample ID: LCS 570-67364/2-A
Matrix: Solid
Analysis Batch: 67332

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 67364

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Diesel Range Organics [C10-C28]	400	389.4		mg/Kg		97	67 - 121

Surrogate	LCS %Recovery	LCS Qualifier	Limits
n-Octacosane (Surr)	103		61 - 145

Lab Sample ID: LCSD 570-67364/3-A
Matrix: Solid
Analysis Batch: 67332

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 67364

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Diesel Range Organics [C10-C28]	400	360.0		mg/Kg		90	67 - 121	8	20

Method: 8015B - Diesel Range Organics (DRO) (GC) (Continued)

Lab Sample ID: LCSD 570-67364/3-A
Matrix: Solid
Analysis Batch: 67332

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 67364

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
n-Octacosane (Surr)	95		61 - 145

Lab Sample ID: 570-27190-A-1-J MS
Matrix: Solid
Analysis Batch: 67332

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 67364

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Diesel Range Organics [C10-C28]	14		409	391.8		mg/Kg		92	33 - 153

Surrogate	MS %Recovery	MS Qualifier	Limits
n-Octacosane (Surr)	98		61 - 145

Lab Sample ID: 570-27190-A-1-K MSD
Matrix: Solid
Analysis Batch: 67332

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 67364

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Diesel Range Organics [C10-C28]	14		393	369.9		mg/Kg		90	33 - 153	6	32

Surrogate	MSD %Recovery	MSD Qualifier	Limits
n-Octacosane (Surr)	97		61 - 145

Method: 8081A - Organochlorine Pesticides (GC)

Lab Sample ID: 570-27181-1 MS
Matrix: Solid
Analysis Batch: 68894

Client Sample ID: SED-004
Prep Type: Total/NA
Prep Batch: 69209

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4' DDD	6.4		4.08	12.90	E	ug/Kg		133	12 - 180
4,4'-DDE	11	E F1 p	4.98	18.93	E	ug/Kg		159	8 - 184
4,4'-DDT	1.7	p	4.98	2.301	p	ug/Kg		11	2 - 187

Surrogate	MS %Recovery	MS Qualifier	Limits
Tetrachloro-m-xylene	75	p	25 - 126
DCB Decachlorobiphenyl (Surr)	134		20 - 155

Lab Sample ID: 570-27181-1 MSD
Matrix: Solid
Analysis Batch: 68894

Client Sample ID: SED-004
Prep Type: Total/NA
Prep Batch: 69209

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
4,4'-DDD	6.4		4.95	19.87	E F1	ug/Kg		273	12 - 180	42	79
4,4'-DDE	11	E F1 p	4.95	18.33	E p	ug/Kg		148	8 - 184	3	76
4,4'-DDT	1.7	p	4.95	4.182	p	ug/Kg		49	2 - 187	58	78

Method: 8081A - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: 570-27181-1 MSD
Matrix: Solid
Analysis Batch: 68894

Client Sample ID: SED-004
Prep Type: Total/NA
Prep Batch: 69209

Surrogate	MSD %Recovery	MSD Qualifier	Limits
Tetrachloro-m-xylene	83	p	25 - 126
DCB Decachlorobiphenyl (Surr)	307	X	20 - 155

Method: 8082 - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 570-67132/1-A
Matrix: Solid
Analysis Batch: 68205

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 67132

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor-1016	ND		10	2.0	ug/Kg		05/05/20 14:07	05/11/20 11:23	1
Aroclor-1221	ND		10	6.3	ug/Kg		05/05/20 14:07	05/11/20 11:23	1
Aroclor-1232	ND		10	2.3	ug/Kg		05/05/20 14:07	05/11/20 11:23	1
Aroclor-1242	ND		10	1.6	ug/Kg		05/05/20 14:07	05/11/20 11:23	1
Aroclor-1248	ND		10	1.2	ug/Kg		05/05/20 14:07	05/11/20 11:23	1
Aroclor-1254	ND		10	1.2	ug/Kg		05/05/20 14:07	05/11/20 11:23	1
Aroclor-1260	ND		10	2.3	ug/Kg		05/05/20 14:07	05/11/20 11:23	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl (Surr)	93		20 - 155	05/05/20 14:07	05/11/20 11:23	1
Tetrachloro-m-xylene (Surr)	83		25 - 126	05/05/20 14:07	05/11/20 11:23	1

Lab Sample ID: LCS 570-67132/4-A
Matrix: Solid
Analysis Batch: 68205

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 67132

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor-1016	20.0	13.78		ug/Kg		69	50 - 142
Aroclor-1260	20.0	15.78		ug/Kg		79	50 - 150

Surrogate	LCS %Recovery	LCS Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	72		20 - 155
Tetrachloro-m-xylene (Surr)	53		25 - 126

Lab Sample ID: LCSD 570-67132/5-A
Matrix: Solid
Analysis Batch: 68205

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 67132

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aroclor-1016	20.0	14.24		ug/Kg		71	50 - 142	3	30
Aroclor-1260	20.0	16.44		ug/Kg		82	50 - 150	4	30

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
DCB Decachlorobiphenyl (Surr)	77		20 - 155
Tetrachloro-m-xylene (Surr)	54		25 - 126

Method: 8082 - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

Lab Sample ID: 570-27181-2 MS
Matrix: Solid
Analysis Batch: 68205

Client Sample ID: SED-005
Prep Type: Total/NA
Prep Batch: 67132

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor-1016	ND	F2 F1	38.6	124.5	F1	ug/Kg	☼	323	20 - 175
Aroclor-1260	120	F1	38.6	186.0		ug/Kg	☼	173	20 - 180

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*144*		*20 - 155*
Tetrachloro-m-xylene (Surr)	*118*		*25 - 126*

Lab Sample ID: 570-27181-2 MSD
Matrix: Solid
Analysis Batch: 68205

Client Sample ID: SED-005
Prep Type: Total/NA
Prep Batch: 67132

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aroclor-1016	ND	F2 F1	38.0	124.5	F1	ug/Kg	☼	327	20 - 175	0	40
Aroclor-1260	120	F1	38.0	201.0	F1	ug/Kg	☼	215	20 - 180	8	40

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*139*		*20 - 155*
Tetrachloro-m-xylene (Surr)	*119*		*25 - 126*

Method: 6020 - Metals (ICP/MS)

Lab Sample ID: MB 570-68912/1-A ^20
Matrix: Solid
Analysis Batch: 69097

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 68912

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.985	0.443	mg/Kg		05/13/20 16:54	05/14/20 08:41	20
Chromium	ND		1.97	0.296	mg/Kg		05/13/20 16:54	05/14/20 08:41	20
Copper	ND		0.985	0.265	mg/Kg		05/13/20 16:54	05/14/20 08:41	20
Lead	ND		0.985	0.212	mg/Kg		05/13/20 16:54	05/14/20 08:41	20
Nickel	ND		0.985	0.266	mg/Kg		05/13/20 16:54	05/14/20 08:41	20
Zinc	ND		4.93	4.55	mg/Kg		05/13/20 16:54	05/14/20 08:41	20

Lab Sample ID: LCS 570-68912/2-A ^20
Matrix: Solid
Analysis Batch: 69097

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 68912

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cadmium	24.9	25.91		mg/Kg		104	80 - 120
Chromium	24.9	24.84		mg/Kg		100	80 - 120
Copper	24.9	26.20		mg/Kg		105	80 - 120
Lead	24.9	24.41		mg/Kg		98	80 - 120
Nickel	24.9	24.93		mg/Kg		100	80 - 120
Zinc	24.9	26.28		mg/Kg		106	80 - 120

Method: 6020 - Metals (ICP/MS) (Continued)

Lab Sample ID: LCSD 570-68912/3-A ^20
Matrix: Solid
Analysis Batch: 69097

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 68912

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Cadmium	25.0	25.90		mg/Kg		104	80 - 120	0	20
Chromium	25.0	25.30		mg/Kg		101	80 - 120	2	20
Copper	25.0	26.22		mg/Kg		105	80 - 120	0	20
Lead	25.0	24.39		mg/Kg		98	80 - 120	0	20
Nickel	25.0	25.37		mg/Kg		101	80 - 120	2	20
Zinc	25.0	26.60		mg/Kg		106	80 - 120	1	20

Lab Sample ID: 570-28125-A-1-B MS ^20
Matrix: Solid
Analysis Batch: 69097

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 68912

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Cadmium	ND		24.6	25.87		mg/Kg		105	85 - 121
Chromium	4.53		24.6	28.90		mg/Kg		99	20 - 182
Copper	7.14		24.6	32.21		mg/Kg		102	25 - 157
Lead	4.75		24.6	28.42		mg/Kg		96	62 - 134
Nickel	3.80		24.6	26.70		mg/Kg		93	46 - 154
Zinc	33.9		24.6	56.53		mg/Kg		92	23 - 173

Lab Sample ID: 570-28125-A-1-C MSD ^20
Matrix: Solid
Analysis Batch: 69097

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 68912

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Cadmium	ND		25.0	25.71		mg/Kg		103	85 - 121	1	12
Chromium	4.53		25.0	29.81		mg/Kg		101	20 - 182	3	15
Copper	7.14		25.0	32.61		mg/Kg		102	25 - 157	1	22
Lead	4.75		25.0	28.54		mg/Kg		95	62 - 134	0	23
Nickel	3.80		25.0	26.86		mg/Kg		92	46 - 154	1	15
Zinc	33.9		25.0	57.54		mg/Kg		94	23 - 173	2	18

Method: 7471A - Mercury (CVAA)

Lab Sample ID: MB 570-68728/1-A
Matrix: Solid
Analysis Batch: 68804

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 68728

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.0847	0.00597	mg/Kg		05/13/20 08:10	05/13/20 13:12	1

Lab Sample ID: LCS 570-68728/2-A
Matrix: Solid
Analysis Batch: 68804

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 68728

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.833	0.8593		mg/Kg		103	85 - 121

Method: 7471A - Mercury (CVAA) (Continued)

Lab Sample ID: LCSD 570-68728/3-A
Matrix: Solid
Analysis Batch: 68804

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 68728

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	0.820	0.8752		mg/Kg		107	85 - 121	2	10

Lab Sample ID: 570-27852-A-1-E MS
Matrix: Solid
Analysis Batch: 68804

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 68728

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	ND		0.905	1.006		mg/Kg	☼	111	71 - 137

Lab Sample ID: 570-27852-A-1-F MSD
Matrix: Solid
Analysis Batch: 68804

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 68728

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	ND		0.862	0.9329		mg/Kg	☼	108	71 - 137	8	14

Method: 9060A - Organic Carbon, Total (TOC)

Lab Sample ID: MB 570-70905/4
Matrix: Solid
Analysis Batch: 70905

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon, Total Organic	ND		500	174	mg/Kg			05/21/20 18:40	1

Lab Sample ID: LCS 570-70905/5
Matrix: Solid
Analysis Batch: 70905

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Carbon, Total Organic	30000	30250		mg/Kg		101	80 - 120

Lab Sample ID: LCSD 570-70905/6
Matrix: Solid
Analysis Batch: 70905

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Carbon, Total Organic	30000	26450		mg/Kg		88	80 - 120	13	20

Lab Sample ID: 570-27650-A-1-A MS
Matrix: Solid
Analysis Batch: 70905

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Carbon, Total Organic	11800		54500	63350		mg/Kg	☼	95	75 - 125

Method: 9060A - Organic Carbon, Total (TOC) (Continued)

Lab Sample ID: 570-27650-A-1-A MSD
Matrix: Solid
Analysis Batch: 70905

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Carbon, Total Organic	11800		53500	66470		mg/Kg	☼	102	75 - 125	5	25

Method: Moisture - Percent Moisture

Lab Sample ID: 570-27185-B-1 DU
Matrix: Solid
Analysis Batch: 66697

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Percent Moisture	7.3		7.1		%		3	10

GC/MS Semi VOA

Prep Batch: 66829

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-27181-1	SED-004	Total/NA	Solid	Organotin Prep	66884
570-27181-2	SED-005	Total/NA	Solid	Organotin Prep	66884
570-27181-3	SED-006	Total/NA	Solid	Organotin Prep	66884
570-27181-4	SE-D-007	Total/NA	Solid	Organotin Prep	66884
MB 570-66829/1-A	Method Blank	Total/NA	Solid	Organotin Prep	
LCS 570-66829/2-A	Lab Control Sample	Total/NA	Solid	Organotin Prep	
LCSD 570-66829/3-A	Lab Control Sample Dup	Total/NA	Solid	Organotin Prep	
660-101903-A-1-A MS	Matrix Spike	Total/NA	Solid	Organotin Prep	
660-101903-A-1-B MSD	Matrix Spike Duplicate	Total/NA	Solid	Organotin Prep	

Cleanup Batch: 66884

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-27181-1	SED-004	Total/NA	Solid	Homogenize Prep	
570-27181-2	SED-005	Total/NA	Solid	Homogenize Prep	
570-27181-3	SED-006	Total/NA	Solid	Homogenize Prep	
570-27181-4	SE-D-007	Total/NA	Solid	Homogenize Prep	
570-27181-3 MS	SED-006	Total/NA	Solid	Homogenize Prep	
570-27181-3 MSD	SED-006	Total/NA	Solid	Homogenize Prep	

Analysis Batch: 67134

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-27181-1	SED-004	Total/NA	Solid	Organotins SIM	66829
570-27181-2	SED-005	Total/NA	Solid	Organotins SIM	66829
570-27181-3	SED-006	Total/NA	Solid	Organotins SIM	66829
570-27181-4	SE-D-007	Total/NA	Solid	Organotins SIM	66829
MB 570-66829/1-A	Method Blank	Total/NA	Solid	Organotins SIM	66829
LCS 570-66829/2-A	Lab Control Sample	Total/NA	Solid	Organotins SIM	66829
LCSD 570-66829/3-A	Lab Control Sample Dup	Total/NA	Solid	Organotins SIM	66829
660-101903-A-1-A MS	Matrix Spike	Total/NA	Solid	Organotins SIM	66829
660-101903-A-1-B MSD	Matrix Spike Duplicate	Total/NA	Solid	Organotins SIM	66829

Prep Batch: 67217

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-27181-1	SED-004	Total/NA	Solid	3541	66884
570-27181-2	SED-005	Total/NA	Solid	3541	66884
570-27181-3	SED-006	Total/NA	Solid	3541	66884
570-27181-4	SE-D-007	Total/NA	Solid	3541	66884
MB 570-67217/1-A	Method Blank	Total/NA	Solid	3541	
LCS 570-67217/2-A	Lab Control Sample	Total/NA	Solid	3541	
LCSD 570-67217/3-A	Lab Control Sample Dup	Total/NA	Solid	3541	
570-27181-3 MS	SED-006	Total/NA	Solid	3541	66884
570-27181-3 MSD	SED-006	Total/NA	Solid	3541	66884

Analysis Batch: 67642

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-27181-4	SE-D-007	Total/NA	Solid	8270C SIM	67217
MB 570-67217/1-A	Method Blank	Total/NA	Solid	8270C SIM	67217

GC/MS Semi VOA (Continued)

Analysis Batch: 67642 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 570-67217/2-A	Lab Control Sample	Total/NA	Solid	8270C SIM	67217

Analysis Batch: 67904

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCSD 570-67217/3-A	Lab Control Sample Dup	Total/NA	Solid	8270C SIM	67217

Analysis Batch: 68220

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-27181-1	SED-004	Total/NA	Solid	8270C SIM	67217
570-27181-2	SED-005	Total/NA	Solid	8270C SIM	67217
570-27181-3	SED-006	Total/NA	Solid	8270C SIM	67217
570-27181-3 MS	SED-006	Total/NA	Solid	8270C SIM	67217
570-27181-3 MSD	SED-006	Total/NA	Solid	8270C SIM	67217

GC Semi VOA

Cleanup Batch: 66884

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-27181-1	SED-004	Total/NA	Solid	Homogenize Prep	
570-27181-2	SED-005	Total/NA	Solid	Homogenize Prep	
570-27181-3	SED-006	Total/NA	Solid	Homogenize Prep	
570-27181-4	SE-D-007	Total/NA	Solid	Homogenize Prep	
570-27181-2 MS	SED-005	Total/NA	Solid	Homogenize Prep	
570-27181-2 MSD	SED-005	Total/NA	Solid	Homogenize Prep	

Prep Batch: 67132

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-27181-1	SED-004	Total/NA	Solid	3541	66884
570-27181-2	SED-005	Total/NA	Solid	3541	66884
570-27181-3	SED-006	Total/NA	Solid	3541	66884
570-27181-4	SE-D-007	Total/NA	Solid	3541	66884
MB 570-67132/1-A	Method Blank	Total/NA	Solid	3541	
LCS 570-67132/4-A	Lab Control Sample	Total/NA	Solid	3541	
LCSD 570-67132/5-A	Lab Control Sample Dup	Total/NA	Solid	3541	
570-27181-2 MS	SED-005	Total/NA	Solid	3541	66884
570-27181-2 MSD	SED-005	Total/NA	Solid	3541	66884

Analysis Batch: 67332

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-27181-1	SED-004	Total/NA	Solid	8015B	67364
570-27181-2	SED-005	Total/NA	Solid	8015B	67364
570-27181-3	SED-006	Total/NA	Solid	8015B	67364
570-27181-4	SE-D-007	Total/NA	Solid	8015B	67364
LCS 570-67364/2-A	Lab Control Sample	Total/NA	Solid	8015B	67364
LCSD 570-67364/3-A	Lab Control Sample Dup	Total/NA	Solid	8015B	67364
570-27190-A-1-J MS	Matrix Spike	Total/NA	Solid	8015B	67364
570-27190-A-1-K MSD	Matrix Spike Duplicate	Total/NA	Solid	8015B	67364

GC Semi VOA

Prep Batch: 67364

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-27181-1	SED-004	Total/NA	Solid	3550C	66884
570-27181-2	SED-005	Total/NA	Solid	3550C	66884
570-27181-3	SED-006	Total/NA	Solid	3550C	66884
570-27181-4	SE-D-007	Total/NA	Solid	3550C	66884
MB 570-67364/1-A	Method Blank	Total/NA	Solid	3550C	
LCS 570-67364/2-A	Lab Control Sample	Total/NA	Solid	3550C	
LCSD 570-67364/3-A	Lab Control Sample Dup	Total/NA	Solid	3550C	
570-27190-A-1-J MS	Matrix Spike	Total/NA	Solid	3550C	
570-27190-A-1-K MSD	Matrix Spike Duplicate	Total/NA	Solid	3550C	

Analysis Batch: 67570

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 570-67364/1-A	Method Blank	Total/NA	Solid	8015B	67364

Analysis Batch: 68205

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-27181-1	SED-004	Total/NA	Solid	8082	67132
570-27181-2	SED-005	Total/NA	Solid	8082	67132
570-27181-3	SED-006	Total/NA	Solid	8082	67132
570-27181-4	SE-D-007	Total/NA	Solid	8082	67132
MB 570-67132/1-A	Method Blank	Total/NA	Solid	8082	67132
LCS 570-67132/4-A	Lab Control Sample	Total/NA	Solid	8082	67132
LCSD 570-67132/5-A	Lab Control Sample Dup	Total/NA	Solid	8082	67132
570-27181-2 MS	SED-005	Total/NA	Solid	8082	67132
570-27181-2 MSD	SED-005	Total/NA	Solid	8082	67132

Analysis Batch: 68894

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-27181-1	SED-004	Total/NA	Solid	8081A	69209
570-27181-1	SED-004	Total/NA	Solid	8081A	69209
570-27181-2	SED-005	Total/NA	Solid	8081A	69209
570-27181-2	SED-005	Total/NA	Solid	8081A	69209
570-27181-3	SED-006	Total/NA	Solid	8081A	69209
570-27181-3	SED-006	Total/NA	Solid	8081A	69209
570-27181-4	SE-D-007	Total/NA	Solid	8081A	69209
570-27181-1 MS	SED-004	Total/NA	Solid	8081A	69209
570-27181-1 MSD	SED-004	Total/NA	Solid	8081A	69209

Cleanup Batch: 69126

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-27181-1	SED-004	Total/NA	Solid	Homogenize Prep	
570-27181-2	SED-005	Total/NA	Solid	Homogenize Prep	
570-27181-3	SED-006	Total/NA	Solid	Homogenize Prep	
570-27181-4	SE-D-007	Total/NA	Solid	Homogenize Prep	
570-27181-1 MS	SED-004	Total/NA	Solid	Homogenize Prep	
570-27181-1 MSD	SED-004	Total/NA	Solid	Homogenize Prep	

GC Semi VOA

Prep Batch: 69209

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-27181-1	SED-004	Total/NA	Solid	3541	69126
570-27181-2	SED-005	Total/NA	Solid	3541	69126
570-27181-3	SED-006	Total/NA	Solid	3541	69126
570-27181-4	SE-D-007	Total/NA	Solid	3541	69126
570-27181-1 MS	SED-004	Total/NA	Solid	3541	69126
570-27181-1 MSD	SED-004	Total/NA	Solid	3541	69126

Metals

Cleanup Batch: 66884

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-27181-1	SED-004	Total/NA	Solid	Homogenize Prep	
570-27181-2	SED-005	Total/NA	Solid	Homogenize Prep	
570-27181-3	SED-006	Total/NA	Solid	Homogenize Prep	
570-27181-4	SE-D-007	Total/NA	Solid	Homogenize Prep	

Prep Batch: 68728

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-27181-1	SED-004	Total/NA	Solid	7471A	66884
570-27181-2	SED-005	Total/NA	Solid	7471A	66884
570-27181-3	SED-006	Total/NA	Solid	7471A	66884
570-27181-4	SE-D-007	Total/NA	Solid	7471A	66884
MB 570-68728/1-A	Method Blank	Total/NA	Solid	7471A	
LCS 570-68728/2-A	Lab Control Sample	Total/NA	Solid	7471A	
LCSD 570-68728/3-A	Lab Control Sample Dup	Total/NA	Solid	7471A	
570-27852-A-1-E MS	Matrix Spike	Total/NA	Solid	7471A	
570-27852-A-1-F MSD	Matrix Spike Duplicate	Total/NA	Solid	7471A	

Analysis Batch: 68804

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-27181-1	SED-004	Total/NA	Solid	7471A	68728
570-27181-2	SED-005	Total/NA	Solid	7471A	68728
570-27181-3	SED-006	Total/NA	Solid	7471A	68728
570-27181-4	SE-D-007	Total/NA	Solid	7471A	68728
MB 570-68728/1-A	Method Blank	Total/NA	Solid	7471A	68728
LCS 570-68728/2-A	Lab Control Sample	Total/NA	Solid	7471A	68728
LCSD 570-68728/3-A	Lab Control Sample Dup	Total/NA	Solid	7471A	68728
570-27852-A-1-E MS	Matrix Spike	Total/NA	Solid	7471A	68728
570-27852-A-1-F MSD	Matrix Spike Duplicate	Total/NA	Solid	7471A	68728

Prep Batch: 68912

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-27181-1	SED-004	Total/NA	Solid	3050B	66884
570-27181-2	SED-005	Total/NA	Solid	3050B	66884
570-27181-3	SED-006	Total/NA	Solid	3050B	66884
570-27181-4	SE-D-007	Total/NA	Solid	3050B	66884
MB 570-68912/1-A ^20	Method Blank	Total/NA	Solid	3050B	
LCS 570-68912/2-A ^20	Lab Control Sample	Total/NA	Solid	3050B	

Metals (Continued)

Prep Batch: 68912 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCSD 570-68912/3-A ^20	Lab Control Sample Dup	Total/NA	Solid	3050B	
570-28125-A-1-B MS ^20	Matrix Spike	Total/NA	Solid	3050B	
570-28125-A-1-C MSD ^20	Matrix Spike Duplicate	Total/NA	Solid	3050B	

Analysis Batch: 69097

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-27181-1	SED-004	Total/NA	Solid	6020	68912
570-27181-2	SED-005	Total/NA	Solid	6020	68912
570-27181-3	SED-006	Total/NA	Solid	6020	68912
570-27181-4	SE-D-007	Total/NA	Solid	6020	68912
MB 570-68912/1-A ^20	Method Blank	Total/NA	Solid	6020	68912
LCS 570-68912/2-A ^20	Lab Control Sample	Total/NA	Solid	6020	68912
LCSD 570-68912/3-A ^20	Lab Control Sample Dup	Total/NA	Solid	6020	68912
570-28125-A-1-B MS ^20	Matrix Spike	Total/NA	Solid	6020	68912
570-28125-A-1-C MSD ^20	Matrix Spike Duplicate	Total/NA	Solid	6020	68912

General Chemistry

Analysis Batch: 66697

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-27181-1	SED-004	Total/NA	Solid	Moisture	
570-27181-2	SED-005	Total/NA	Solid	Moisture	
570-27181-3	SED-006	Total/NA	Solid	Moisture	
570-27181-4	SE-D-007	Total/NA	Solid	Moisture	
570-27185-B-1 DU	Duplicate	Total/NA	Solid	Moisture	

Cleanup Batch: 66884

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-27181-1	SED-004	Total/NA	Solid	Homogenize Prep	
570-27181-2	SED-005	Total/NA	Solid	Homogenize Prep	
570-27181-3	SED-006	Total/NA	Solid	Homogenize Prep	
570-27181-4	SE-D-007	Total/NA	Solid	Homogenize Prep	

Cleanup Batch: 67938

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-27650-A-1-A MS	Matrix Spike	Total/NA	Solid	Homogenize Prep	
570-27650-A-1-A MSD	Matrix Spike Duplicate	Total/NA	Solid	Homogenize Prep	

Analysis Batch: 70905

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-27181-1	SED-004	Total/NA	Solid	9060A	66884
570-27181-2	SED-005	Total/NA	Solid	9060A	66884
570-27181-3	SED-006	Total/NA	Solid	9060A	66884
570-27181-4	SE-D-007	Total/NA	Solid	9060A	66884
MB 570-70905/4	Method Blank	Total/NA	Solid	9060A	
LCS 570-70905/5	Lab Control Sample	Total/NA	Solid	9060A	
LCSD 570-70905/6	Lab Control Sample Dup	Total/NA	Solid	9060A	

General Chemistry (Continued)

Analysis Batch: 70905 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-27650-A-1-A MS	Matrix Spike	Total/NA	Solid	9060A	67938
570-27650-A-1-A MSD	Matrix Spike Duplicate	Total/NA	Solid	9060A	67938

Geotechnical

Analysis Batch: 68372

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-27181-1	SED-004	Total/NA	Solid	D4464	
570-27181-2	SED-005	Total/NA	Solid	D4464	
570-27181-3	SED-006	Total/NA	Solid	D4464	
570-27181-4	SE-D-007	Total/NA	Solid	D4464	

Lab Chronicle

Client: WGR Southwest Inc
Project/Site: WGR - Tesoro LA Refinery

Job ID: 570-27181-1

Client Sample ID: SED-004
Date Collected: 04/30/20 16:10
Date Received: 05/01/20 13:56

Lab Sample ID: 570-27181-1
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Cleanup	Homogenize Prep					66884	05/04/20 13:41	C4LT	ECL 1
Total/NA	Prep	3541			20.2 g	2 mL	67217	05/05/20 21:50	UM1W	ECL 1
Total/NA	Analysis	8270C SIM		2			68220	05/11/20 21:07	AJ2Q	ECL 1
	Instrument ID: GCMSMM									
Total/NA	Prep	Organotin Prep			10.3 g	5 mL	66829	05/04/20 09:52	UWEZ	ECL 1
Total/NA	Cleanup	Homogenize Prep					66884	05/04/20 13:41	C4LT	ECL 1
Total/NA	Analysis	Organotins SIM		1			67134	05/05/20 20:17	AJ2Q	ECL 1
	Instrument ID: GCMSY									
Total/NA	Cleanup	Homogenize Prep					66884	05/04/20 13:41	C4LT	ECL 1
Total/NA	Prep	3550C			9.60 g	10 mL	67364	05/06/20 15:46	N5Y3	ECL 1
Total/NA	Analysis	8015B		1			67332	05/07/20 02:10	N5Y3	ECL 1
	Instrument ID: GC50									
Total/NA	Prep	3541			20.2 g	2 mL	69209	05/11/20 20:49	USUL	ECL 1
Total/NA	Analysis	8081A		5			68894	05/14/20 06:24	UHHN	ECL 1
	Instrument ID: GC51									
Total/NA	Cleanup	Homogenize Prep					69126	05/14/20 13:37	C4LT	ECL 1
Total/NA	Prep	3541			20.2 g	2 mL	69209	05/11/20 20:49	USUL	ECL 1
Total/NA	Analysis	8081A		1			68894	05/14/20 08:47	UHHN	ECL 1
	Instrument ID: GC51									
Total/NA	Cleanup	Homogenize Prep					69126	05/14/20 13:37	C4LT	ECL 1
Total/NA	Cleanup	Homogenize Prep					66884	05/04/20 13:41	C4LT	ECL 1
Total/NA	Prep	3541			20.2 g	2 mL	67132	05/05/20 14:07	UM1W	ECL 1
Total/NA	Analysis	8082		1			68205	05/11/20 14:04	UHHN	ECL 1
	Instrument ID: GC58									
Total/NA	Cleanup	Homogenize Prep					66884	05/04/20 13:41	C4LT	ECL 1
Total/NA	Prep	3050B			1.96 g	100 mL	68912	05/13/20 16:54	X7RL	ECL 1
Total/NA	Analysis	6020		20			69097	05/14/20 09:17	UFLE	ECL 1
	Instrument ID: ICPMS05									
Total/NA	Cleanup	Homogenize Prep					66884	05/04/20 13:41	C4LT	ECL 1
Total/NA	Prep	7471A			0.59 g	100 mL	68728	05/13/20 08:10	MD3A	ECL 1
Total/NA	Analysis	7471A		1			68804	05/13/20 13:42	MD3A	ECL 1
	Instrument ID: HG8									
Total/NA	Cleanup	Homogenize Prep					66884	05/04/20 13:41	C4LT	ECL 1
Total/NA	Analysis	9060A		1	206.7 mg	206.7 mg	70905	05/21/20 18:40	CY2M	ECL 1
	Instrument ID: TOC8									
Total/NA	Analysis	Moisture		1			66697	05/02/20 11:03	W6MG	ECL 2
	Instrument ID: NOEQUIP									
Total/NA	Analysis	D4464		1			68372	05/11/20 15:29	C4LT	ECL 1
	Instrument ID: NOEQUIP									

Lab Chronicle

Client: WGR Southwest Inc
Project/Site: WGR - Tesoro LA Refinery

Job ID: 570-27181-1

Client Sample ID: SED-005
Date Collected: 04/30/20 14:30
Date Received: 05/01/20 13:56

Lab Sample ID: 570-27181-2
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Cleanup	Homogenize Prep					66884	05/04/20 13:41	C4LT	ECL 1
Total/NA	Prep	3541			20.4 g	2 mL	67217	05/05/20 21:50	UM1W	ECL 1
Total/NA	Analysis	8270C SIM		2			68220	05/11/20 21:31	AJ2Q	ECL 1
	Instrument ID: GCMSMM									
Total/NA	Prep	Organotin Prep			10.3 g	5 mL	66829	05/04/20 09:52	UWEZ	ECL 1
Total/NA	Cleanup	Homogenize Prep					66884	05/04/20 13:41	C4LT	ECL 1
Total/NA	Analysis	Organotins SIM		1			67134	05/05/20 20:35	AJ2Q	ECL 1
	Instrument ID: GCMSY									
Total/NA	Cleanup	Homogenize Prep					66884	05/04/20 13:41	C4LT	ECL 1
Total/NA	Prep	3550C			9.89 g	10 mL	67364	05/06/20 15:46	N5Y3	ECL 1
Total/NA	Analysis	8015B		1			67332	05/07/20 02:30	N5Y3	ECL 1
	Instrument ID: GC50									
Total/NA	Prep	3541			20.2 g	2 mL	69209	05/11/20 20:49	USUL	ECL 1
Total/NA	Analysis	8081A		5			68894	05/14/20 06:38	UHHN	ECL 1
	Instrument ID: GC51									
Total/NA	Cleanup	Homogenize Prep					69126	05/14/20 13:37	C4LT	ECL 1
Total/NA	Prep	3541			20.2 g	2 mL	69209	05/11/20 20:49	USUL	ECL 1
Total/NA	Analysis	8081A		1			68894	05/14/20 09:01	UHHN	ECL 1
	Instrument ID: GC51									
Total/NA	Cleanup	Homogenize Prep					69126	05/14/20 13:37	C4LT	ECL 1
Total/NA	Cleanup	Homogenize Prep					66884	05/04/20 13:41	C4LT	ECL 1
Total/NA	Prep	3541			20.2 g	2 mL	67132	05/05/20 14:07	UM1W	ECL 1
Total/NA	Analysis	8082		1			68205	05/11/20 12:34	UHHN	ECL 1
	Instrument ID: GC58									
Total/NA	Cleanup	Homogenize Prep					66884	05/04/20 13:41	C4LT	ECL 1
Total/NA	Prep	3050B			2.04 g	100 mL	68912	05/13/20 16:54	X7RL	ECL 1
Total/NA	Analysis	6020		20			69097	05/14/20 09:20	UFLE	ECL 1
	Instrument ID: ICPMS05									
Total/NA	Cleanup	Homogenize Prep					66884	05/04/20 13:41	C4LT	ECL 1
Total/NA	Prep	7471A			0.58 g	100 mL	68728	05/13/20 08:10	MD3A	ECL 1
Total/NA	Analysis	7471A		1			68804	05/13/20 13:44	MD3A	ECL 1
	Instrument ID: HG8									
Total/NA	Cleanup	Homogenize Prep					66884	05/04/20 13:41	C4LT	ECL 1
Total/NA	Analysis	9060A		1	208.2 mg	208.2 mg	70905	05/21/20 18:40	CY2M	ECL 1
	Instrument ID: TOC8									
Total/NA	Analysis	Moisture		1			66697	05/02/20 11:03	W6MG	ECL 2
	Instrument ID: NOEQUIP									
Total/NA	Analysis	D4464		1			68372	05/11/20 15:37	C4LT	ECL 1
	Instrument ID: NOEQUIP									

Lab Chronicle

Client: WGR Southwest Inc
Project/Site: WGR - Tesoro LA Refinery

Job ID: 570-27181-1

Client Sample ID: SED-006
Date Collected: 04/30/20 12:30
Date Received: 05/01/20 13:56

Lab Sample ID: 570-27181-3
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Cleanup	Homogenize Prep					66884	05/04/20 13:41	C4LT	ECL 1
Total/NA	Prep	3541			20.3 g	2 mL	67217	05/05/20 21:50	UM1W	ECL 1
Total/NA	Analysis	8270C SIM		2			68220	05/11/20 21:55	AJ2Q	ECL 1
	Instrument ID: GCMSMM									
Total/NA	Prep	Organotin Prep			10.0 g	5 mL	66829	05/04/20 09:52	UWEZ	ECL 1
Total/NA	Cleanup	Homogenize Prep					66884	05/04/20 13:41	C4LT	ECL 1
Total/NA	Analysis	Organotins SIM		1			67134	05/05/20 20:53	AJ2Q	ECL 1
	Instrument ID: GCMSY									
Total/NA	Cleanup	Homogenize Prep					66884	05/04/20 13:41	C4LT	ECL 1
Total/NA	Prep	3550C			10.37 g	10 mL	67364	05/06/20 15:46	N5Y3	ECL 1
Total/NA	Analysis	8015B		1			67332	05/07/20 02:50	N5Y3	ECL 1
	Instrument ID: GC60									
Total/NA	Prep	3541			20.4 g	2 mL	69209	05/11/20 20:49	USUL	ECL 1
Total/NA	Analysis	8081A		5			68894	05/14/20 06:52	UHHN	ECL 1
	Instrument ID: GC51									
Total/NA	Cleanup	Homogenize Prep					69126	05/14/20 13:37	C4LT	ECL 1
Total/NA	Prep	3541			20.4 g	2 mL	69209	05/11/20 20:49	USUL	ECL 1
Total/NA	Analysis	8081A		1			68894	05/14/20 09:15	UHHN	ECL 1
	Instrument ID: GC51									
Total/NA	Cleanup	Homogenize Prep					69126	05/14/20 13:37	C4LT	ECL 1
Total/NA	Cleanup	Homogenize Prep					66884	05/04/20 13:41	C4LT	ECL 1
Total/NA	Prep	3541			20.4 g	2 mL	67132	05/05/20 21:57	UM1W	ECL 1
Total/NA	Analysis	8082		1			68205	05/11/20 13:28	UHHN	ECL 1
	Instrument ID: GC58									
Total/NA	Cleanup	Homogenize Prep					66884	05/04/20 13:41	C4LT	ECL 1
Total/NA	Prep	3050B			2.03 g	100 mL	68912	05/13/20 16:54	X7RL	ECL 1
Total/NA	Analysis	6020		20			69097	05/14/20 09:22	UFLE	ECL 1
	Instrument ID: ICPMS05									
Total/NA	Cleanup	Homogenize Prep					66884	05/04/20 13:41	C4LT	ECL 1
Total/NA	Prep	7471A			0.58 g	100 mL	68728	05/13/20 08:10	MD3A	ECL 1
Total/NA	Analysis	7471A		1			68804	05/13/20 13:45	MD3A	ECL 1
	Instrument ID: HG8									
Total/NA	Cleanup	Homogenize Prep					66884	05/04/20 13:41	C4LT	ECL 1
Total/NA	Analysis	9060A		1	201.8 mg	201.8 mg	70905	05/21/20 18:40	CY2M	ECL 1
	Instrument ID: TOC8									
Total/NA	Analysis	Moisture		1			66697	05/02/20 11:03	W6MG	ECL 2
	Instrument ID: NOEQUIP									
Total/NA	Analysis	D4464		1			68372	05/11/20 15:46	C4LT	ECL 1
	Instrument ID: NOEQUIP									

Lab Chronicle

Client: WGR Southwest Inc
Project/Site: WGR - Tesoro LA Refinery

Job ID: 570-27181-1

Client Sample ID: SE-D-007
Date Collected: 04/30/20 11:04
Date Received: 05/01/20 13:56

Lab Sample ID: 570-27181-4
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Cleanup	Homogenize Prep					66884	05/04/20 13:41	C4LT	ECL 1
Total/NA	Prep	3541			20.1 g	2 mL	67217	05/05/20 21:50	UM1W	ECL 1
Total/NA	Analysis	8270C SIM		1			67642	05/07/20 17:57	AJ2Q	ECL 1
	Instrument ID: GCMSMM									
Total/NA	Prep	Organotin Prep			10.1 g	5 mL	66829	05/04/20 09:52	UWEZ	ECL 1
Total/NA	Cleanup	Homogenize Prep					66884	05/04/20 13:41	C4LT	ECL 1
Total/NA	Analysis	Organotins SIM		1			67134	05/05/20 21:10	AJ2Q	ECL 1
	Instrument ID: GCMSY									
Total/NA	Cleanup	Homogenize Prep					66884	05/04/20 13:41	C4LT	ECL 1
Total/NA	Prep	3550C			10.47 g	10 mL	67364	05/06/20 15:46	N5Y3	ECL 1
Total/NA	Analysis	8015B		1			67332	05/07/20 03:11	N5Y3	ECL 1
	Instrument ID: GC50									
Total/NA	Prep	3541			20.2 g	2 mL	69209	05/11/20 20:49	USUL	ECL 1
Total/NA	Analysis	8081A		1			68894	05/14/20 09:29	UHHN	ECL 1
	Instrument ID: GC51									
Total/NA	Cleanup	Homogenize Prep					69126	05/14/20 18:19	C4LT	ECL 1
Total/NA	Cleanup	Homogenize Prep					66884	05/04/20 13:41	C4LT	ECL 1
Total/NA	Prep	3541			20.2 g	2 mL	67132	05/05/20 21:57	UM1W	ECL 1
Total/NA	Analysis	8082		1			68205	05/11/20 13:46	UHHN	ECL 1
	Instrument ID: GC58									
Total/NA	Cleanup	Homogenize Prep					66884	05/04/20 13:41	C4LT	ECL 1
Total/NA	Prep	3050B			1.98 g	100 mL	68912	05/13/20 16:54	X7RL	ECL 1
Total/NA	Analysis	6020		20			69097	05/14/20 09:25	UFLE	ECL 1
	Instrument ID: ICPMS05									
Total/NA	Cleanup	Homogenize Prep					66884	05/04/20 13:41	C4LT	ECL 1
Total/NA	Prep	7471A			0.61 g	100 mL	68728	05/13/20 08:10	MD3A	ECL 1
Total/NA	Analysis	7471A		1			68804	05/13/20 13:47	MD3A	ECL 1
	Instrument ID: HG8									
Total/NA	Cleanup	Homogenize Prep					66884	05/04/20 13:41	C4LT	ECL 1
Total/NA	Analysis	9060A		1	201.8 mg	201.8 mg	70905	05/21/20 18:40	CY2M	ECL 1
	Instrument ID: TOC8									
Total/NA	Analysis	Moisture		1			66697	05/02/20 11:03	W6MG	ECL 2
	Instrument ID: NOEQUIP									
Total/NA	Analysis	D4464		1			68372	05/11/20 15:54	C4LT	ECL 1
	Instrument ID: NOEQUIP									

Laboratory References:

ECL 1 = Eurofins Calscience LLC Lincoln, 7440 Lincoln Way, Garden Grove, CA 92841, TEL (714)895-5494

ECL 2 = Eurofins Calscience LLC Lampson, 7445 Lampson Ave, Garden Grove, CA 92841, TEL (714)895-5494

Accreditation/Certification Summary

Client: WGR Southwest Inc
Project/Site: WGR - Tesoro LA Refinery

Job ID: 570-27181-1

Laboratory: Eurofins Calscience LLC

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
California	Los Angeles County Sanitation Districts	10109	09-29-20
California	SCAQMD LAP	17LA0919	11-30-20
California	State	2944	09-29-20
Guam	State	20-003R	10-31-20
Nevada	State	CA00111	07 31 20
Oregon	NELAP	CA300001	01-29-21
USDA	US Federal Programs	P330-20-00034	02-10-23
Washington	State	C916-18	10-11-20

Method Summary

Client: WGR Southwest Inc
Project/Site: WGR - Tesoro LA Refinery

Job ID: 570-27181-1

Method	Method Description	Protocol	Laboratory
8270C SIM	PAHs (GC/MS SIM)	SW846	ECL 1
Organotins SIM	Organotins (GC/MS SIM)	Lab SOP	ECL 1
8015B	Diesel Range Organics (DRO) (GC)	SW846	ECL 1
8081A	Organochlorine Pesticides (GC)	SW846	ECL 1
8082	Polychlorinated Biphenyls (PCBs) by Gas Chromatography	SW846	ECL 1
6020	Metals (ICP/MS)	SW846	ECL 1
7471A	Mercury (CVAA)	SW846	ECL 1
9060A	Organic Carbon, Total (TOC)	SW846	ECL 1
Moisture	Percent Moisture	EPA	ECL 2
D4464	Particle Size Distribution of Catalytic Material (Laser light scattering)	ASTM	ECL 1
3050B	Preparation, Metals	SW846	ECL 1
3541	Automated Soxhlet Extraction	SW846	ECL 1
3550C	Ultrasonic Extraction	SW846	ECL 1
7471A	Preparation, Mercury	SW846	ECL 1
Homogenize Prep	Preparation, Homogenization	None	ECL 1
Organotin Prep	Extraction (Organotins)	None	ECL 1

Protocol References:

ASTM = ASTM International
EPA = US Environmental Protection Agency
Lab SOP = Laboratory Standard Operating Procedure
None = None
SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

ECL 1 = Eurofins Calscience LLC Lincoln, 7440 Lincoln Way, Garden Grove, CA 92841, TEL (714)895-5494
ECL 2 = Eurofins Calscience LLC Lampson, 7445 Lampson Ave, Garden Grove, CA 92841, TEL (714)895-5494

Sample Summary

Client: WGR Southwest Inc
Project/Site: WGR - Tesoro LA Refinery

Job ID: 570-27181-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
570-27181-1	SED-004	Solid	04/30/20 16:10	05/01/20 13:56	
570-27181-2	SED-005	Solid	04/30/20 14:30	05/01/20 13:56	
570-27181-3	SED-006	Solid	04/30/20 12:30	05/01/20 13:56	
570-27181-4	SE-D-007	Solid	04/30/20 11:04	05/01/20 13:56	

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Loc: 570
27181

(WIDE MOUTH JARS)

Tesoro Los Angeles Refinery - Carson Operations

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Facility Name: LA Refinery - Carson Operations	City, State (Facility): 1801 E. Sepulveda Blvd., Carson CA 90749	Project Manager (Consultant): Chelsea Dreyer	Project No. (Consultant): 021.APC.01
Facility Contact: Nate Busch	Facility Telephone No.: (310) 847-3920	Telephone No. (Consultant): (562) 799-8510 ex. 1003	Fax No. (Consultant): (562) 799-8510
Consultant Company: WGR Southwest, Inc.	Consultant Address: 11021 Winners Circle #101 Los Alamitos, California 90720		

Laboratory Name: Eurofins Calscience
7440 Lincoln Way
Garden Grove 92841
(714) 895-5494
Lab Project Manager: Xuan Dang

Special Detection Limit/Reporting

Please report MDL and RL for all analytes

Duplicate samples must be analyzed at a frequency of 5%

Sample I.D.	Lab Sample No.	No. of Containers	Matrix: Soil	Water	Air	Other	Prsv.: Yes	No	Sampling Date	Sampling Time	Total Metals (see text box)	Chlordane EPA 8081A	PCBs (EPA 8082 - see text box)	Sediment grain size ASTM D4464	DDT (see text box)	Total Organic Carbon EPA 9060A	TPH EPA 8015B	Tributyltin Krone et al.	PAHs (EPA 8270C - see text box)	FIELD ANALYSES: pH (SU) [6.5-8.5]	Salinity (PSU) ppt	Dissolved Oxygen (mg/L) [mean>7; single>5]	Specific Conductance (µS/cm)	Turbidity (NTU) [<50]	Temp (°C) ~~Flow (cms)~~ (if possible)
~~SED-001~~		~~2~~	~~X~~				~~X~~				~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~						
~~SED-002~~		~~2~~	~~X~~				~~X~~				~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~						
~~SED-003~~		~~2~~	~~X~~				~~X~~				~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~						
SED-004		2	X				X		4/30/20	1610	X	X	X	X	X	X	X	X	X	7.91	23.7	4.65	37.4	11.8	24.91
SED-005		2	X				X		4/30/20	1430	X	X	X	X	X	X	X	X	X	7.75	21.6	9.30	34.4	8.3	25.76
SED-006		2	X				X		4/30/20	1230	X	X	X	X	X	X	X	X	X	7.61	19.9	4.21	31.9	8.8	25.43
SED-007		2	X				X		4/30/20	1105	X	X	X	X	X	X	X	X	X	7.37	18.3	4.1	29.4	7.5	24.38

Total Metals analyzed with EPA 6020:
Cadmium; Chromium; Copper; Lead; Nickel; Zinc
Total Metals analyzed with EPA 7471A:
Mercury
PCBs
Sum of Arochlor 1016, Arochlor 1221, Arochlor 1232, Arochlor 1242, Arochlor 1248, Arochlor 1254, and Arochlor 1260
DDT
Sum of 4,4'-DDT, 2,4'-DDT, 4,4'-DDE, 2,4'-DDE, 4,4'-DDD, and 2,4'-DDD
PAHs
Sum of acenaphthene, anthracene, 1,2-benzanthracene, 3,4-benzofluoranthene, benzo(k)fluoranthene, 1,12-benzoperylene,

570-27181 Chain of Custody

Special QA/QC

Sub'd COC Attch'd:

REMARK

Email Results to:
nbusch@marathonpetroleum.com
cdreyer@wgr-sw.com
aballrot@wgr-sw.com

Sample Received Intact: Yes No		Temperature received: Ice No ice	
Relinquished by SAMPLER (Print & Sign Name): David Montelongo	Date: 5/1/20 Time: 17:56	Received by (Print & Sign Name): EC	
Relinquished by (Print & Sign Name)	Date Time	Received by LABORATORY (Print & Sign Name)	Lab Work No.

2.9/2.0 SC6

Revised 9/23/2019

5/22/2020

Login Sample Receipt Checklist

Client: WGR Southwest Inc

Job Number: 570-27181-1

Login Number: 27181
List Number: 1
Creator: Liao, Gineyau

List Source: Eurofins Calscience

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

ATTACHMENT 4

SEDIMENT MONITORING
AQUATIC BIOASSAY
ANALYTICAL LABORATORY REPORT

Tesoro Refining & Marketing Company LLC
Los Angeles Refinery – Carson Operations
Dominguez Channel Estuary
April 2020 Sediment Monitoring Report

aquatic bioassay & consulting laboratories, inc

June 4, 2020

Amber Ballrot
WGR Southwest, Inc.
1801 E. Sepulveda Blvd.
Carson, CA 90749

Dear Mrs.Ballrot:

We are pleased to present the enclosed bioassay report. The test was conducted under guidelines prescribed in *Methods for Assessing the Toxicity of Sediment-associated Contaminants with Estuarine and Marine Amphipods, Method EPA/600/R-94/025.* Results were as follows:

CLIENT:	WGR Southwest, Inc.
SAMPLE I.D.:	SED-004
DATE RECEIVED:	5/1/2020
ABC LAB. NO.:	WGR0520.004

ACUTE EOHAUSTORIUS SURVIVAL BIOASSAY

NOEC	=	100.00 %
TUc	=	1.00
EC25	=	>100.00 %
EC50	=	>100.00 %

Yours very truly,

Scott Johnson
Laboratory Director

CETIS Summary Report

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	17-3915-7507	**Test Type:**	Survival-Reburial	**Analyst:**	Joe Freas
Start Date:	05 May-20 13:00	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	15 May-20 13:00	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Test Length:	10d 0h	**Taxon:**	Malacostraca	**Source:**	Northwestern Aquatic Scienc Age:
Sample ID:	15-9636-4471	**Code:**	WGR0520.004	**Project:**	021.APC.01
Sample Date:	30 Apr-20 16:05	**Material:**	Sediment	**Source:**	Bioassay Report
Receipt Date:	01 May-20 16:10	**CAS (PC):**		**Station:**	SED-004
Sample Age:	4d 21h	**Client:**	WGR Southwest Inc.		

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
08-8685-6214	Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	100% passed survival rate	1

Test Acceptability

				TAC Limits			
Analysis ID	**Endpoint**	**Attribute**	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
08-8685-6214	Survival Rate	Control Resp	1	0.9	>>	Yes	Passes Criteria

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
100		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%

Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000

Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	20/20	20/20	20/20	20/20	20/20
100		20/20	20/20	20/20	20/20	20/20

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	08-8685-6214	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.5
Analyzed:	04 Jun-20 14:08	**Analysis:**	Nonparametric-Two Sample	**Status Level:**	1
Batch ID:	17-3915-7507	**Test Type:**	Survival-Reburial	**Analyst:**	Joe Freas
Start Date:	05 May-20 13:00	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	15 May-20 13:00	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Test Length:	10d 0h	**Taxon:**	Malacostraca	**Source:**	Northwestern Aquatic Scienc **Age:**
Sample ID:	15-9636-4471	**Code:**	WGR0520.004	**Project:**	021 APC.01
Sample Date:	30 Apr-20 16:05	**Material:**	Sediment	**Source:**	Bioassay Report
Receipt Date:	01 May-20 16:10	**CAS (PC):**		**Station:**	SED-004
Sample Age:	4d 21h	**Client:**	WGR Southwest Inc.		

Data Transform	Alt Hyp	Comparison Result
Angular (Corrected)	C > T	100% passed survival rate

Wilcoxon Rank Sum Two-Sample Test

Control	vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		100	27.5	n/a	1	8	Exact	1.0000	Non-Significant Effect

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	1	0.9	>>	Yes	Passes Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	65540	<1.0E-37	Significant Effect
Error	0	0	8			
Total	0		9			

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	5	1.0000	1.0000	1.0000		1.0000	1.0000	0.0000	0.00%	0.00%
100		5	1.0000	1.0000	1.0000		1.0000	1.0000	0.0000	0.00%	0.00%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	5	1.459	1.458	1.459		1.459	1.459	0	0.00%	0.00%
100		5	1.459	1.458	1.459		1.459	1.459	0	0.00%	0.00%

Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000

Angular (Corrected) Transformed Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	1.459	1.459	1.459	1.459	1.459
100		1.459	1.459	1.459	1.459	1.459

Analysis ID:	08-8685-6214	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.5
Analyzed:	04 Jun-20 14:08	**Analysis:**	Nonparametric-Two Sample	**Status Level:**	1

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	17-3915-7507	**Test Type:**	Survival-Reburial	**Analyst:**	Joe Freas
Start Date:	05 May-20 13:00	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	15 May-20 13:00	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Test Length:	10d 0h	**Taxon:**	Malacostraca	**Source:**	Northwestern Aquatic Scienc **Age:**

Sample ID:	15-9636-4471	**Code:**	WGR0520.004	**Project:**	021 APC.01
Sample Date:	30 Apr-20 16:05	**Material:**	Sediment	**Source:**	Bioassay Report
Receipt Date:	01 May-20 16:10	**CAS (PC):**		**Station:**	SED-004
Sample Age:	4d 21h	**Client:**	WGR Southwest Inc		

Dissolved Oxygen-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	9.85	9.215	10.49	9.8	9.9	0.05	0.0707	0.72%	0
100		2	9.95	9.315	10.59	9.9	10	0.05001	0.07073	0.71%	0
Overall		4	9.9	9.77	10.03	9.8	10	0.04082	0.08165	0.82%	0 (0%)

pH-Units

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
100		2	7.75	7.115	8.385	7.7	7.8	0.05001	0.07072	0.91%	0
Overall		4	7.825	7.673	7.977	7.7	7.9	0.04787	0.09574	1.22%	0 (0%)

Salinity-ppt

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	20	20	20	20	20	0	0	0.0%	0
100		2	20	20	20	20	20	0	0	0.0%	0
Overall		4	20	20	20	20	20	0	0	0.00%	0 (0%)

Temperature-°C

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	14.85	14.21	15.49	14.8	14.9	0.05004	0.07077	0.48%	0
100		2	14.85	14.21	15.49	14.8	14.9	0.05004	0.07077	0.48%	0
Overall		4	14.85	14.76	14.94	14.8	14.9	0.02887	0.05773	0.39%	0 (0%)

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Dissolved Oxygen-mg/L

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		9.9					
100				9.9					
0	N	2		9.8					
100				10					

pH-Units

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		7.9					
100				7.7					
0	N	2		7.9					
100				7.8					

Salinity-ppt

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		20					
100				20					
0	N	2		20					
100				20					

Temperature-°C

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		14.8					
100				14.8					
0	N	2		14.9					
100				14.9					

aquatic bioassay & consulting laboratories, inc

June 4, 2020

Amber Ballrot
WGR Southwest, Inc.
1801 E. Sepulveda Blvd.
Carson, CA 90749

Dear Mrs.Ballrot:

We are pleased to present the enclosed bioassay report. The test was conducted under guidelines prescribed in *Methods for Assessing the Toxicity of Sediment-associated Contaminants with Estuarine and Marine Amphipods, Method EPA/600/R-94/025.* Results were as follows:

CLIENT:	WGR Southwest, Inc.
SAMPLE I.D.:	SED-005
DATE RECEIVED:	5/1/2020
ABC LAB. NO.:	WGR0520.005

ACUTE EOHAUSTORIUS SURVIVAL BIOASSAY

NOEC	=	100.00 %
TUc	=	1.00
EC25	=	>100.00 %
EC50	=	>100.00 %

Yours very truly,

Scott Johnson
Laboratory Director

CETIS Summary Report

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	13-7617-4475	**Test Type:**	Survival-Reburial	**Analyst:**	Joe Freas
Start Date:	05 May-20 13:01	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	15 May-20 13:01	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Test Length:	10d 0h	**Taxon:**	Malacostraca	**Source:**	Northwestern Aquatic Scienc **Age:**
Sample ID:	04-6158-0956	**Code:**	WGR0520.005	**Project:**	021 APC 01
Sample Date:	30 Apr-20 14:30	**Material:**	Sediment	**Source:**	Bioassay Report
Receipt Date:	01 May-20 16:10	**CAS (PC):**		**Station:**	SED-005
Sample Age:	4d 23h	**Client:**	WGR Southwest Inc.		

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
15-2973-4738	Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	100% passed survival rate	!

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
15-2973-4738	Survival Rate	Control Resp	1	0.9	>>	Yes	Passes Criteria

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
100		5	0.9900	0.9622	1.0000	0.9500	1.0000	0.0100	0.0224	2.26%	1.00%

Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	1.0000	1.0000	1.0000	1.0000	1.0000
100		0.9500	1.0000	1.0000	1.0000	1.0000

Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	20/20	20/20	20/20	20/20	20/20
100		19/20	20/20	20/20	20/20	20/20

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	15-2973-4738	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.5
Analyzed:	04 Jun-20 14:15	**Analysis:**	Nonparametric-Two Sample	**Status Level:**	1
Batch ID:	13-7617-4475	**Test Type:**	Survival-Reburial	**Analyst:**	Joe Freas
Start Date:	05 May-20 13:01	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	15 May-20 13:01	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Test Length:	10d 0h	**Taxon:**	Malacostraca	**Source:**	Northwestern Aquatic Scienc **Age:**
Sample ID:	04-6158-0956	**Code:**	WGR0520.005	**Project:**	021.APC 01
Sample Date:	30 Apr-20 14:30	**Material:**	Sediment	**Source:**	Bioassay Report
Receipt Date:	01 May-20 16:10	**CAS (PC):**		**Station:**	SED-005
Sample Age:	4d 23h	**Client:**	WGR Southwest Inc.		

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	100% passed survival rate	2.36%

Wilcoxon Rank Sum Two-Sample Test

Control	vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		100	25	n/a	1	8	Exact	0.5000	Non-Significant Effect

Test Acceptability Criteria — TAC Limits

Attribute	Test Stat	Lower	Upper	Overlap	Decision
Control Resp	1	0.9	>>	Yes	Passes Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0012877	0.0012877	1	1	0.3466	Non-Significant Effect
Error	0.0103014	0.0012877	8			
Total	0.0115891		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Levene Equality of Variance Test	7.111	11.26	0.0285	Equal Variances
	Mod Levene Equality of Variance Test	1	13.75	0.3559	Equal Variances
Distribution	Anderson-Darling A2 Normality Test	1.796	3.878	<1.0E-37	Non-Normal Distribution
	D'Agostino Skewness Test	3.335	2.576	8.5E-04	Non-Normal Distribution
	Kolmogorov-Smirnov D Test	0.4	0.3025	6.1E-05	Non-Normal Distribution
	Shapiro-Wilk W Normality Test	0.6247	0.7411	1.1E-04	Non-Normal Distribution

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	5	1.0000	1.0000	1.0000		1.0000	1.0000	0.0000	0.00%	0.00%
100		5	0.9900	0.9622	1.0000		0.9500	1.0000	0.0100	2.26%	1.00%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	5	1.459	1.458	1.459		1.459	1.459	0	0.00%	0.00%
100		5	1.438	1.373	1.499		1.345	1.459	0.02269	3.53%	1.56%

Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	1.0000	1.0000	1.0000	1.0000	1.0000
100		0.9500	1.0000	1.0000	1.0000	1.0000

Angular (Corrected) Transformed Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	1.459	1.459	1.459	1.459	1.459
100		1.345	1.459	1.459	1.459	1.459

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	15-2973-4738	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.5
Analyzed:	04 Jun-20 14:15	**Analysis:**	Nonparametric-Two Sample	**Status Level:**	1

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	13-7617-4475	**Test Type:**	Survival-Reburial	**Analyst:**	Joe Freas
Start Date:	05 May-20 13:01	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	15 May-20 13:01	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Test Length:	10d 0h	**Taxon:**	Malacostraca	**Source:**	Northwestern Aquatic Scienc **Age:**

Sample ID:	04-6158-0956	**Code:**	WGR0520.005	**Project:**	021.APC.01
Sample Date:	30 Apr-20 14:30	**Material:**	Sediment	**Source:**	Bioassay Report
Receipt Date:	01 May-20 16:10	**CAS (PC):**		**Station:**	SED-005
Sample Age:	4d 23h	**Client:**	WGR Southwest Inc		

Dissolved Oxygen-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	8.2	4.368	12.01	7.9	8.5	0.3	0.4243	5.17%	0
100		2	8.9	-6.347	24.15	7.7	10.1	1.2	1.697	19.07%	0
Overall		4	8.55	6.819	10.28	7.7	10.1	0.5439	1.088	12.72%	0 (0%)

pH-Units

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
100		2	7.7	7.698	7.702	7.7	7.7	0	0	0.0%	0
Overall		4	7.8	7.616	7.984	7.7	7.9	0.05774	0.1155	1.48%	0 (0%)

Salinity-ppt

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	20	20	20	20	20	0	0	0.0%	0
100		2	20	20	20	20	20	0	0	0.0%	0
Overall		4	20	20	20	20	20	0	0	0.00%	0 (0%)

Temperature-°C

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	14.85	14.21	15.49	14.8	14.9	0.05004	0.07077	0.48%	0
100		2	14.7	14.68	14.72	14.7	14.7	0	0	0.0%	0
Overall		4	14.77	14.62	14.93	14.7	14.9	0.04787	0.09574	0.65%	0 (0%)

Eohaustorius 10-d Survival and Reburial Sediment Test — Aquatic Bioassay & Consulting Labs, Inc.

Dissolved Oxygen-mg/L

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		7.9					
100				7.7					
0	N	2		8.5					
100				10.1					

pH-Units

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		7.9					
100				7.7					
0	N	2		7.9					
100				7.7					

Salinity-ppt

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		20					
100				20					
0	N	2		20					
100				20					

Temperature-°C

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		14.8					
100				14.7					
0	N	2		14.9					
100				14.7					

aquatic bioassay & consulting laboratories, inc

June 4, 2020

Amber Ballrot
WGR Southwest, Inc.
1801 E. Sepulveda Blvd.
Carson, CA 90749

Dear Mrs.Ballrot:

We are pleased to present the enclosed bioassay report. The test was conducted under guidelines prescribed in *Methods for Assessing the Toxicity of Sediment-associated Contaminants with Estuarine and Marine Amphipods, Method EPA/600/R-94/025.* Results were as follows:

CLIENT:	WGR Southwest, Inc.
SAMPLE I.D.:	SED-006
DATE RECEIVED:	5/1/2020
ABC LAB. NO.:	WGR0520.006

ACUTE EOHAUSTORIUS SURVIVAL BIOASSAY

NOEC	=	100.00 %
TUc	=	1.00
EC25	=	>100.00 %
EC50	=	>100.00 %

Yours very truly,

Scott Johnson
Laboratory Director

CETIS Summary Report

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	06-5084-6734	**Test Type:**	Survival-Reburial	**Analyst:**	Joe Freas
Start Date:	05 May-20 13:02	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	15 May-20 13:02	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Test Length:	10d 0h	**Taxon:**	Malacostraca	**Source:**	Northwestern Aquatic Scienc **Age:**
Sample ID:	12-8966-3448	**Code:**	WGR0520.006	**Project:**	021.APC.01
Sample Date:	30 Apr-20 12:30	**Material:**	Sediment	**Source:**	Bioassay Report
Receipt Date:	01 May-20 16:10	**CAS (PC):**		**Station:**	SED-006
Sample Age:	5d 1h	**Client:**	WGR Southwest Inc		

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
06-3987-2589	Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	100% passed survival rate	1

Test Acceptability

				TAC Limits			
Analysis ID	**Endpoint**	**Attribute**	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
06-3987-2589	Survival Rate	Control Resp	1	0.9	>>	Yes	Passes Criteria

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
100		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%

Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000

Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	20/20	20/20	20/20	20/20	20/20
100		20/20	20/20	20/20	20/20	20/20

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	06-3987-2589	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.5
Analyzed:	04 Jun-20 14:18	**Analysis:**	Nonparametric-Two Sample	**Status Level:**	1
Batch ID:	06-5084-6734	**Test Type:**	Survival-Reburial	**Analyst:**	Joe Freas
Start Date:	05 May-20 13:02	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	15 May-20 13:02	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Test Length:	10d 0h	**Taxon:**	Malacostraca	**Source:**	Northwestern Aquatic Scienc **Age:**
Sample ID:	12-8966-3448	**Code:**	WGR0520.006	**Project:**	021.APC.01
Sample Date:	30 Apr-20 12:30	**Material:**	Sediment	**Source:**	Bioassay Report
Receipt Date:	01 May-20 16:10	**CAS (PC):**		**Station:**	SED-006
Sample Age:	5d 1h	**Client:**	WGR Southwest Inc		

Data Transform	Alt Hyp	Comparison Result
Angular (Corrected)	C > T	100% passed survival rate

Wilcoxon Rank Sum Two-Sample Test

Control	vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		100	27.5	n/a	1	8	Exact	1.0000	Non-Significant Effect

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	1	0.9	>>	Yes	Passes Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	65540	<1.0E-37	Significant Effect
Error	0	0	8			
Total	0		9			

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	5	1.0000	1.0000	1.0000		1.0000	1.0000	0.0000	0.00%	0.00%
100		5	1.0000	1.0000	1.0000		1.0000	1.0000	0.0000	0.00%	0.00%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	5	1.459	1.458	1.459		1.459	1.459	0	0.00%	0.00%
100		5	1.459	1.458	1.459		1.459	1.459	0	0.00%	0.00%

Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000

Angular (Corrected) Transformed Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	1.459	1.459	1.459	1.459	1.459
100		1.459	1.459	1.459	1.459	1.459

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	06-3987-2589	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.5
Analyzed:	04 Jun-20 14:18	**Analysis:**	Nonparametric-Two Sample	**Status Level:**	1

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	06-5084-6734	**Test Type:**	Survival-Reburial	**Analyst:**	Joe Freas
Start Date:	05 May-20 13:02	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	15 May-20 13:02	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Test Length:	10d 0h	**Taxon:**	Malacostraca	**Source:**	Northwestern Aquatic Scienc **Age:**

Sample ID:	12-8966-3448	**Code:**	WGR0520.006	**Project:**	021.APC.01
Sample Date:	30 Apr-20 12:30	**Material:**	Sediment	**Source:**	Bioassay Report
Receipt Date:	01 May-20 16:10	**CAS (PC):**		**Station:**	SED-006
Sample Age:	5d 1h	**Client:**	WGR Southwest Inc		

Dissolved Oxygen-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	8.2	4.388	12.01	7.9	8.5	0.3	0.4243	5.17%	0
100		2	10	10	10	10	10	0	0	0.0%	0
Overall		4	9.1	7.401	10.8	7.9	10	0.5339	1.068	11.73%	0 (0%)

pH-Units

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
100		2	7.95	7.315	8.585	7.9	8	0.04999	0.0707	0.89%	0
Overall		4	7.925	7.845	8.005	7.9	8	0.025	0.05	0.63%	0 (0%)

Salinity-ppt

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	20	20	20	20	20	0	0	0.0%	0
100		2	20	20	20	20	20	0	0	0.0%	0
Overall		4	20	20	20	20	20	0	0	0.00%	0 (0%)

Temperature-°C

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	14.85	14.21	15.49	14.8	14.9	0.05004	0.07077	0.48%	0
100		2	14.85	14.21	15.49	14.8	14.9	0.05004	0.07077	0.48%	0
Overall		4	14.85	14.76	14.94	14.8	14.9	0.02887	0.05773	0.39%	0 (0%)

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Dissolved Oxygen-mg/L

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		7.9					
100				10					
0	N	2		8.5					
100				10					

pH-Units

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		7.9					
100				8					
0	N	2		7.9					
100				7.9					

Salinity-ppt

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		20					
100				20					
0	N	2		20					
100				20					

Temperature-°C

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		14.8					
100				14.8					
0	N	2		14.9					
100				14.9					

aquatic bioassay & consulting laboratories, inc

June 4, 2020

Amber Ballrot
WGR Southwest, Inc.
1801 E. Sepulveda Blvd.
Carson, CA 90749

Dear Mrs.Ballrot:

We are pleased to present the enclosed bioassay report. The test was conducted under guidelines prescribed in *Methods for Assessing the Toxicity of Sediment-associated Contaminants with Estuarine and Marine Amphipods, Method EPA/600/R-94/025.* Results were as follows:

CLIENT:	WGR Southwest, Inc.
SAMPLE I.D.:	SED-007
DATE RECEIVED:	5/1/2020
ABC LAB. NO.:	WGR0520.007

ACUTE EOHAUSTORIUS SURVIVAL BIOASSAY

NOEC	=	100.00 %
TUc	=	1.00
EC25	=	>100.00 %
EC50	=	>100.00 %

Yours very truly,

Scott Johnson
Laboratory Director

CETIS Summary Report

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	02-5872-3289	**Test Type:**	Survival-Reburial	**Analyst:**	Joe Freas
Start Date:	05 May-20 13:03	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	15 May-20 13:03	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Test Length:	10d 0h	**Taxon:**	Malacostraca	**Source:**	Northwestern Aquatic Scienc **Age:**
Sample ID:	12-9198-1077	**Code:**	WGR0520.007	**Project:**	021.APC.01
Sample Date:	30 Apr-20 11:00	**Material:**	Sediment	**Source:**	Bioassay Report
Receipt Date:	01 May-20 16:10	**CAS (PC):**		**Station:**	SED-007
Sample Age:	5d 2h	**Client:**	WGR Southwest Inc.		

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
18-7151-9781	Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	100% passed survival rate	f

Test Acceptability

				TAC Limits			
Analysis ID	**Endpoint**	**Attribute**	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
18-7151-9781	Survival Rate	Control Resp	1	0.9	>>	Yes	Passes Criteria

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
100		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%

Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000

Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	20/20	20/20	20/20	20/20	20/20
100		20/20	20/20	20/20	20/20	20/20

CETIS Analytical Report

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	18-7151-9781	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1 9.5
Analyzed:	04 Jun-20 14:20	**Analysis:**	Nonparametric-Two Sample	**Status Level:**	1
Batch ID:	02-5872-3289	**Test Type:**	Survival-Reburial	**Analyst:**	Joe Freas
Start Date:	05 May-20 13:03	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	15 May-20 13:03	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Test Length:	10d 0h	**Taxon:**	Malacostraca	**Source:**	Northwestern Aquatic Scienc **Age:**
Sample ID:	12-9198-1077	**Code:**	WGR0520.007	**Project:**	021 APC 01
Sample Date:	30 Apr-20 11:00	**Material:**	Sediment	**Source:**	Bioassay Report
Receipt Date:	01 May-20 16:10	**CAS (PC):**		**Station:**	SED-007
Sample Age:	5d 2h	**Client:**	WGR Southwest Inc		

Data Transform	Alt Hyp	Comparison Result
Angular (Corrected)	C > T	100% passed survival rate

Wilcoxon Rank Sum Two-Sample Test

Control	vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		100	27.5	n/a	1	8	Exact	1.0000	Non-Significant Effect

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	1	0.9	>>	Yes	Passes Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	65540	<1.0E-37	Significant Effect
Error	0	0	8			
Total	0		9			

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	5	1.0000	1.0000	1.0000		1.0000	1.0000	0.0000	0.00%	0.00%
100		5	1.0000	1.0000	1.0000		1.0000	1.0000	0.0000	0.00%	0.00%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	5	1.459	1.458	1.459		1.459	1.459	0	0.00%	0.00%
100		5	1.459	1.458	1.459		1.459	1.459	0	0.00%	0.00%

Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000

Angular (Corrected) Transformed Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	1.459	1.459	1.459	1.459	1.459
100		1.459	1.459	1.459	1.459	1.459

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	18-7151-9781	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.5
Analyzed:	04 Jun-20 14:20	**Analysis:**	Nonparametric-Two Sample	**Status Level:**	1

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	02-5872-3289	**Test Type:**	Survival-Reburial	**Analyst:**	Joe Freas
Start Date:	05 May-20 13:03	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	15 May-20 13:03	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Test Length:	10d 0h	**Taxon:**	Malacostraca	**Source:**	Northwestern Aquatic Scienc **Age:**

Sample ID:	12-9198-1077	**Code:**	WGR0520.007	**Project:**	021.APC.01
Sample Date:	30 Apr-20 11:00	**Material:**	Sediment	**Source:**	Bioassay Report
Receipt Date:	01 May-20 16:10	**CAS (PC):**		**Station:**	SED-007
Sample Age:	5d 2h	**Client:**	WGR Southwest Inc.		

Dissolved Oxygen-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	10.05	9.415	10.69	10	10.1	0.05001	0.07073	0.7%	0
100		2	10.05	9.415	10.69	10	10.1	0.05001	0.07073	0.7%	0
Overall		4	10.05	9.958	10.14	10	10.1	0.02887	0.05774	0.57%	0 (0%)

pH-Units

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
100		2	7.85	5.944	9.756	7.7	8	0.15	0.2121	2.7%	0
Overall		4	7.875	7.675	8.075	7.7	8	0.06292	0.1258	1.60%	0 (0%)

Salinity-ppt

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	20	20	20	20	20	0	0	0.0%	0
100		2	20	20	20	20	20	0	0	0.0%	0
Overall		4	20	20	20	20	20	0	0	0.00%	0 (0%)

Temperature-°C

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	14.85	14.21	15.49	14.8	14.9	0.05004	0.07077	0.48%	0
100		2	14.85	14.21	15.49	14.8	14.9	0.05004	0.07077	0.48%	0
Overall		4	14.85	14.76	14.94	14.8	14.9	0.02887	0.05773	0.39%	0 (0%)

Eohaustorius 10-d Survival and Reburial Sediment Test — Aquatic Bioassay & Consulting Labs, Inc.

Dissolved Oxygen-mg/L

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		10.1					
100				10.1					
0	N	2		10					
100				10					

pH-Units

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		7.9					
100				8					
0	N	2		7.9					
100				7.7					

Salinity-ppt

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		20					
100				20					
0	N	2		20					
100				20					

Temperature-°C

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		14.8					
100				14.8					
0	N	2		14.9					
100				14.9					

aquatic bioassay & consulting laboratories, inc

96 Hour *Eohaustorius estuarius* Survival Bioassay - Standard Toxicant

DATE: 5/5/2020

STANDARD TOXICANT: Ammonium Chloride

ENDPOINT: SURVIVAL

UNIONIZED AMMONIA

NOEC = 0.452 mg/L

EC25 = 1.347mg/L
EC50 = 2.152mg/L

Yours very truly,

Scott Johnson
Laboratory Director

CETIS Summary Report

Reference Toxicant 96-h Acute Survival Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	11-3267-0880	**Test Type:**	Survival	**Analyst:**	Joe Freas
Start Date:	05 May-20 13:05	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	09 May-20 13:05	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Test Length:	96h	**Taxon:**	Malacostraca	**Source:**	Northwestern Aquatic Scienc Age:
Sample ID:	06-7733-0739	**Code:**	EOH050520	**Project:**	REF TOX
Sample Date:	05 May-20 13:05	**Material:**	Ammonia (Unionized)	**Source:**	Reference Toxicant
Receipt Date:		**CAS (PC):**		**Station:**	REF TOX
Sample Age:	n/a	**Client:**	Internal Lab		

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	TU	PMSD	S
07-3615-2608	Survival Rate	Steel Many-One Rank Sum Test		0.452	0.806	0.6036		7.2%	1

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	✓	Level	mg/L	95% LCL	95% UCL	TU	S
05-4686-7001	Survival Rate	Linear Interpolation (ICPIN)		EC5	0.5936	0.5289	0.6502		1
				EC10	0.7352	0.6057	0.8485		
				EC15	0.9143	0.6601	1.203		
				EC20	1.131	0.8421	1.65		
				EC25	1.347	1.001	1.962		
				EC40	1.878	1.351	2.218		
				EC50	2.152	1.653	2.435		

Survival Rate Summary

Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
0.227		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
0.452		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
0.806		4	0.8750	0.7954	0.9546	0.8000	0.9000	0.0250	0.0500	5.71%	12.50%
1.672		4	0.6750	0.4748	0.8752	0.5000	0.8000	0.0629	0.1258	18.64%	32.50%
3.524		4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%

Survival Rate Detail

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.0000	1.0000	1.0000	1.0000
0.227		1.0000	1.0000	1.0000	1.0000
0.452		1.0000	1.0000	1.0000	1.0000
0.806		0.9000	0.8000	0.9000	0.9000
1.672		0.8000	0.7000	0.7000	0.5000
3.524		0.0000	0.0000	0.0000	0.0000

Survival Rate Binomials

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	10/10	10/10	10/10	10/10
0.227		10/10	10/10	10/10	10/10
0.452		10/10	10/10	10/10	10/10
0.806		9/10	8/10	9/10	9/10
1.672		8/10	7/10	7/10	5/10
3.524		0/10	0/10	0/10	0/10

Reference Toxicant 96-h Acute Survival Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	07-3615-2608	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.5
Analyzed:	04 Jun-20 14:24	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Batch ID:	11-3267 0880	**Test Type:**	Survival	**Analyst:**	Joe Freas
Start Date:	05 May-20 13:05	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	09 May-20 13:05	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Test Length:	96h	**Taxon:**	Malacostraca	**Source:**	Northwestern Aquatic Scienc **Age:**
Sample ID:	06-7733-0739	**Code:**	EOH050520	**Project:**	REF TOX
Sample Date:	05 May-20 13:05	**Material:**	Ammonia (Unionized)	**Source:**	Reference Toxicant
Receipt Date:		**CAS (PC):**		**Station:**	REF TOX
Sample Age:	n/a	**Client:**	Internal Lab		

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	0.452	0.806	0.6036		7.20%

Steel Many-One Rank Sum Test

Control	vs	Conc-mg/L	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		0.227	18	10	1	6	CDF	0.8000	Non-Significant Effect
		0.452	18	10	1	6	CDF	0.8000	Non-Significant Effect
		0.806*	10	10	0	6	CDF	0.0350	Significant Effect
		1.672*	10	10	0	6	CDF	0.0350	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.614114	0.153529	4	33.44	2.8E-07	Significant Effect
Error	0.0688773	0.0045918	15			
Total	0.682992		19			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Levene Equality of Variance Test	4.407	4.893	0.0149	Equal Variances
	Mod Levene Equality of Variance Test	1.68	4.893	0.2067	Equal Variances
Distribution	Anderson-Darling A2 Normality Test	3.19	3.878	<1.0E-37	Non-Normal Distribution
	D'Agostino Kurtosis Test	2.94	2.576	0.0033	Non-Normal Distribution
	D'Agostino Skewness Test	2.287	2.576	0.0222	Normal Distribution
	D'Agostino-Pearson K2 Omnibus Test	13.87	9.21	9.7E-04	Non-Normal Distribution
	Kolmogorov-Smirnov D Test	0.4	0.2235	2.9E-09	Non-Normal Distribution
	Shapiro-Wilk W Normality Test	0.7104	0.866	5.2E-05	Non-Normal Distribution

Survival Rate Summary

Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
0.227		4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
0.452		4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
0.806		4	0.8750	0.7954	0.9546	0.9000	0.8000	0.9000	0.0250	5.71%	12.50%
1.672		4	0.6750	0.4748	0.8752	0.7000	0.5000	0.8000	0.0629	18.64%	32.50%
3.524		4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%

Angular (Corrected) Transformed Summary

Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	1.412	1.412	1.412	1.412	1.412	1.412	0	0.00%	0.00%
0.227		4	1.412	1.412	1.412	1.412	1.412	1.412	0	0.00%	0.00%
0.452		4	1.412	1.412	1.412	1.412	1.412	1.412	0	0.00%	0.00%
0.806		4	1.214	1.101	1.326	1.249	1.107	1.249	0.03547	5.85%	14.05%
1.672		4	0.9687	0.7557	1.182	0.9912	0.7854	1.107	0.06694	13.82%	31.39%
3.524		4	0.1588	0.1588	0.1588	0.1588	0.1588	0.1588	0	0.00%	88.76%

Reference Toxicant 96-h Acute Survival Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	07-3615-2608	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.5
Analyzed:	04 Jun-20 14:24	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1

Survival Rate Detail

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.0000	1.0000	1.0000	1.0000
0.227		1.0000	1.0000	1.0000	1.0000
0.452		1.0000	1.0000	1.0000	1.0000
0.806		0.9000	0.8000	0.9000	0.9000
1.672		0.8000	0.7000	0.7000	0.5000
3.524		0.0000	0.0000	0.0000	0.0000

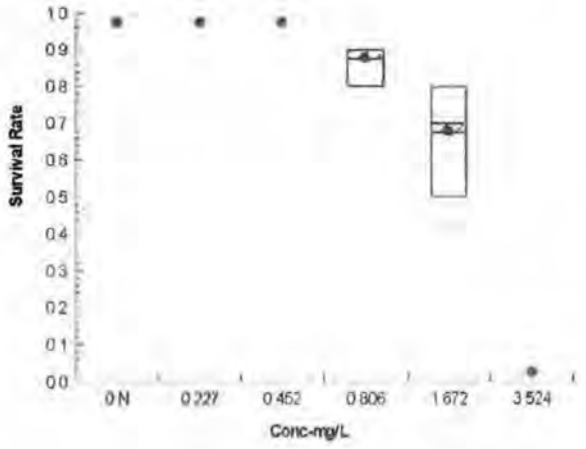
Angular (Corrected) Transformed Detail

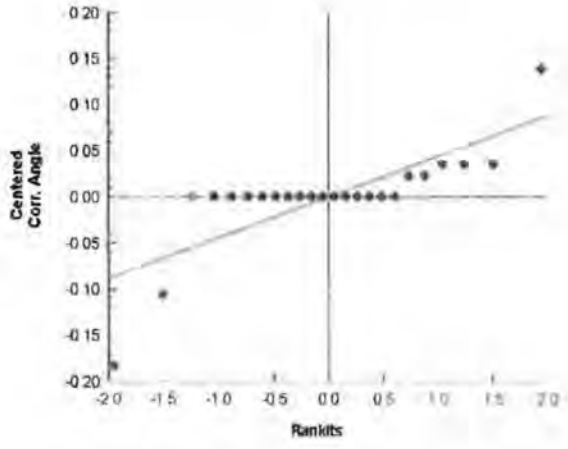
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.412	1.412	1.412	1.412
0.227		1.412	1.412	1.412	1.412
0.452		1.412	1.412	1.412	1.412
0.806		1.249	1.107	1.249	1.249
1.672		1.107	0.9912	0.9912	0.7854
3.524		0.1588	0.1588	0.1588	0.1588

Survival Rate Binomials

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	10/10	10/10	10/10	10/10
0.227		10/10	10/10	10/10	10/10
0.452		10/10	10/10	10/10	10/10
0.806		9/10	8/10	9/10	9/10
1.672		8/10	7/10	7/10	5/10
3.524		0/10	0/10	0/10	0/10

Graphics





Reference Toxicant 96-h Acute Survival Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	05-4686-7001	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.5
Analyzed:	04 Jun-20 14:24	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1
Batch ID:	11-3267-0880	**Test Type:**	Survival	**Analyst:**	Joe Freas
Start Date:	05 May-20 13:05	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	09 May-20 13:05	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Test Length:	96h	**Taxon:**	Malacostraca	**Source:**	Northwestern Aquatic Scienc **Age:**
Sample ID:	06-7733-0739	**Code:**	EOH050520	**Project:**	REF TOX
Sample Date:	05 May-20 13:05	**Material:**	Ammonia (Unionized)	**Source:**	Reference Toxicant
Receipt Date:		**CAS (PC):**		**Station:**	REF TOX
Sample Age:	n/a	**Client:**	Internal Lab		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	0	280	Yes	Two-Point Interpolation

Point Estimates

Level	mg/L	95% LCL	95% UCL
EC5	0.5936	0.5289	0.6502
EC10	0.7352	0.6057	0.8485
EC15	0.9143	0.6601	1.203
EC20	1.131	0.8421	1.65
EC25	1.347	1.001	1.962
EC40	1.878	1.351	2.218
EC50	2.152	1.653	2.435

Survival Rate Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-mg/L	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	N	4	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	40/40	1	0.0%
0.227		4	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	40/40	1	0.0%
0.452		4	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	40/40	1	0.0%
0.806		4	0.8750	0.8000	0.9000	0.0500	5.71%	12.5%	35/40	0.875	12.5%
1.672		4	0.6750	0.5000	0.8000	0.1258	18.64%	32.5%	27/40	0.675	32.5%
3.524		4	0.0000	0.0000	0.0000	0.0000		100.0%	0/40	0	100.0%

Survival Rate Detail

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.0000	1.0000	1.0000	1.0000
0.227		1.0000	1.0000	1.0000	1.0000
0.452		1.0000	1.0000	1.0000	1.0000
0.806		0.9000	0.8000	0.9000	0.9000
1.672		0.8000	0.7000	0.7000	0.5000
3.524		0.0000	0.0000	0.0000	0.0000

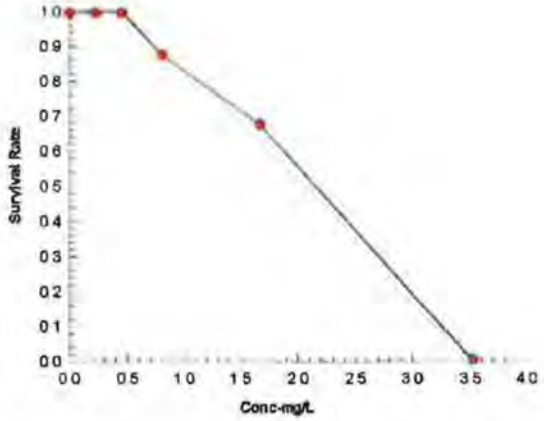
Survival Rate Binomials

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	10/10	10/10	10/10	10/10
0.227		10/10	10/10	10/10	10/10
0.452		10/10	10/10	10/10	10/10
0.806		9/10	8/10	9/10	9/10
1.672		8/10	7/10	7/10	5/10
3.524		0/10	0/10	0/10	0/10

Reference Toxicant 96-h Acute Survival Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	05-4686-7001	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.5
Analyzed:	04 Jun-20 14:24	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1

Graphics



Reference Toxicant 96-h Acute Survival Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	11-3267-0880	**Test Type:**	Survival	**Analyst:**	Joe Freas
Start Date:	05 May-20 13:05	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	09 May-20 13:05	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Test Length:	96h	**Taxon:**	Malacostraca	**Source:**	Northwestern Aquatic Scienc **Age:**

Sample ID:	06-7733-0739	**Code:**	EOH050520	**Project:**	REF TOX
Sample Date:	05 May-20 13:05	**Material:**	Ammonia (Unionized)	**Source:**	Reference Toxicant
Receipt Date:		**CAS (PC):**		**Station:**	REF TOX
Sample Age:	n/a	**Client:**	Internal Lab		

Dissolved Oxygen-mg/L

Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	7.65	-6.962	22.26	6.5	8.8	1.15	1.626	21.26%	0
0.227		2	6.75	-7.862	21.36	5.6	7.9	1.15	1.626	24.09%	0
0.452		2	6.55	2.103	11	6.2	6.9	0.35	0.495	7.56%	0
0.806		2	7.65	7.015	8.285	7.6	7.7	0.05	0.07071	0.92%	0
1.672		2	7.6	6.329	8.871	7.5	7.7	0.1	0.1414	1.86%	0
3.524		2	7	7	7	7	7	0	0	0.0%	0
Overall		12	7.2	6.657	7.743	5.6	8.8	0.2485	0.8539	11.86%	0 (0%)

pH-Units

Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
0.227		2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
0.452		2	7.8	7.787	7.813	7.8	7.8	0	0	0.0%	0
0.806		2	7.8	7.787	7.813	7.8	7.8	0	0	0.0%	0
1.672		2	7.7	7.698	7.702	7.7	7.7	0	0	0.0%	0
3.524		2	7.7	7.698	7.702	7.7	7.7	0	0	0.0%	0
Overall		12	7.8	7.746	7.854	7.7	7.9	0.02462	0.08528	1.09%	0 (0%)

Salinity-ppt

Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	20	20	20	20	20	0	0	0.0%	0
0.227		2	20	20	20	20	20	0	0	0.0%	0
0.452		2	20	20	20	20	20	0	0	0.0%	0
0.806		2	20	20	20	20	20	0	0	0.0%	0
1.672		2	20	20	20	20	20	0	0	0.0%	0
3.524		2	20	20	20	20	20	0	0	0.0%	0
Overall		12	20	20	20	20	20	0	0	0.00%	0 (0%)

Temperature-°C

Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	14.85	14.21	15.49	14.8	14.9	0.05004	0.07077	0.48%	0
0.227		2	14.85	14.21	15.49	14.8	14.9	0.05004	0.07077	0.48%	0
0.452		2	14.85	14.21	15.49	14.8	14.9	0.05004	0.07077	0.48%	0
0.806		2	14.85	14.21	15.49	14.8	14.9	0.05004	0.07077	0.48%	0
1.672		2	14.85	14.21	15.49	14.8	14.9	0.05004	0.07077	0.48%	0
3.524		2	14.85	14.21	15.49	14.8	14.9	0.05004	0.07077	0.48%	0
Overall		12	14.85	14.82	14.88	14.8	14.9	0.01508	0.05222	0.35%	0 (0%)

Reference Toxicant 96-h Acute Survival Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Dissolved Oxygen-mg/L

Conc-mg/L	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		8.8					
0.227				7.9					
0.452				6.2					
0.806				7.7					
1.672				7.5					
3.524				7					
0	N	2		6.5					
0.227				5.6					
0.452				6.9					
0.806				7.6					
1.672				7.7					
3.524				7					

pH-Units

Conc-mg/L	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		7.9					
0.227				7.9					
0.452				7.8					
0.806				7.8					
1.672				7.7					
3.524				7.7					
0	N	2		7.9					
0.227				7.9					
0.452				7.8					
0.806				7.8					
1.672				7.7					
3.524				7.7					

Salinity-ppt

Conc-mg/L	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		20					
0.227				20					
0.452				20					
0.806				20					
1.672				20					
3.524				20					
0	N	2		20					
0.227				20					
0.452				20					
0.806				20					
1.672				20					
3.524				20					

Reference Toxicant 96-h Acute Survival Test — Aquatic Bioassay & Consulting Labs, Inc.

Temperature-°C

Conc-mg/L	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		14.8					
0.227				14.8					
0.452				14.8					
0.806				14.8					
1.672				14.8					
3.524				14.8					
0	N	2		14.9					
0.227				14.9					
0.452				14.9					
0.806				14.9					
1.672				14.9					
3.524				14.9					

(PLASTIC BAGS)

Tesoro Los Angeles Refinery - Carson Operations

Facility Name	City, State (Facility)	Project Manager (Consultant)	Project No. (Consultant)	Laboratory Name
LA Refinery - Carson Operations	1801 E. Sepulveda Blvd., Carson CA 90749	Chelsea Dreyer	021.APC.01	Aquatic Bioassay 29 N Olive Street Ventura 93001 (805) 643-5621
Facility Contact	**Facility Telephone No.**	**Telephone No. (Consultant)**	**Fax No. (Consultant)**	
Nate Busch	(310) 847-3920	(562) 799-8510 ex. 1003	(562) 799-8510	
Consultant Company	**Consultant Address**			
WGR Southwest, Inc.	11021 Winners Circle #101 Los Alamitos, California 90720			

Sample I.D.	Lab Sample No.	No. of Containers	Matrix: Soil	Water	Air	Other	Prsv.: Yes	No	Sampling Date	Sampling Time	*Eohaustorius estuarius* (EPA 600/R-94/025)	*Mytilus galloprovincialis* (EPA 600/R-95/136) (TCN)
~~SED-001~~		2	X				X				X	X
~~SED-002~~		2	X				X				X	X
~~SED-003~~		2	X				X				X	X
SED-004		2	X				X		4/30/20	1605	X	X
SED-005		2	X				X		4/30/20	1430	X	X
SED-006		2	X				X		4/30/20	1230	X	X
SED-007		2	X				X		4/30/20	1100	X	X

Sample bottles required for each sample point:
(2) x 1-gallon plastic bag

Special Detection Limit/Reporting

Please report MDL and RL for all analytes

Duplicate samples must be analyzed at a frequency of 5%

Special QA/QC

Sub'd COC Attch'd:

004
005
006
007

REMARK

Email Results to:
nbusch@marathonpetroleum.com
cdreyer@wgr-sw.com
aballrot@wgr-sw.com

Sample Received Intact: Yes No

Temperature received: Ice No ice

Relinquished by **SAMPLER** (Print & Sign Name)	Date	Time	Received by (Print & Sign Name)
David Montelongo	5/1/20		5/1/20 1610
Relinquished by (Print & Sign Name)	**Date**	**Time**	**Received by LABORATORY (Print & Sign Name)**

Lab Work No.

Revised 9/23/2019

ATTACHMENT 5

ORGANIC/INORGANIC ANALYTICAL VALIDATION REPORT

Tesoro Refining & Marketing Company LLC
Los Angeles Refinery – Carson Operations
Dominguez Channel Estuary
April 2020 Sediment Monitoring Report

Tesoro Refining & Marketing LLC
Los Angeles Refinery – Carson Operations
Organic/Inorganic Analytical Validation Report

Table of Contents

1.0 Overview 1

1.1 Data Assessment 2

1.2 Overall Data Review Narrative 3

Attachments:

Attachment I - Dominguez Channel Estuary Sediment Monitoring Inorganic/Organic Analytical Validation Form

1.0 Overview

The Tesoro Refining & Marketing Company LLC, Los Angeles Refinery – Carson Operations (herein facility) collected sediment samples at monitoring locations SED-004, SED-005, SED-006, and SED-007 on April 30, 2020. Collected samples were submitted to the laboratory on May 1, 2020 for analysis as required in NPDES Permit No. CA0000680 Attachment E, Table E-7.

Sediment monitoring analysis was performed by laboratories certified under the Environmental Laboratory Accreditation Program (ELAP). Sediment chemistry samples were analyzed by Eurofins Calscience, Inc. in Garden Grove California with ELAP accreditation number 2944 and chronic toxicity samples were submitted to Aquatic Bioassay and Consulting Laboratories, Inc. in Ventura, California with ELAP accreditation number 1907. This document presents the analytical validation criteria used to determine the usability of data gathered as result of the sediment monitoring conducted. Analytical data was evaluated based on the validation criteria set forth in the *National Functional Guidelines for Organic Superfund Methods Data Review*, document number USEPA-540-R-2017-002, January 2017, and the *USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review*, document number USEPA 540-R-2017-001, January 2017, as applied to the reported methodology. Sediment monitoring parameters, including the sample type and corresponding analytical method, are listed in Table 1.0 below.

Table 1.0 - Sediment Monitoring Parameters

Parameters	Sample Type	Analytical Method
Cadmium, Total Recoverable	Surface Grab	EPA 6020B
Chlordane	Surface Grab	EPA 8081A
Chromium, Total	Surface Grab	EPA 6020B
Copper, Total Recoverable	Surface Grab	EPA 6020B
Lead, Total Recoverable	Surface Grab	EPA 6020B
Mercury, Total Recoverable	Surface Grab	EPA 7471A
Nickel, Total Recoverable	Surface Grab	EPA 6020B
Zinc, Total Recoverable	Surface Grab	EPA 6020B
PCBs[1]	Surface Grab	EPA 8082A
Sediment Grain Size	Surface Grab	ASTM D4464
Chronic Toxicity	Surface Grab	-
Pesticides	Surface Grab	EPA 8081A
Total Organic Carbon	Surface Grab	EPA 9060A

Table 1.0 - Sediment Monitoring Parameters		
Total Petroleum Hydrocarbons[2]	Surface Grab	EPA 8015B
Tributyltin	Surface Grab	Krone et. Al.
Polynuclear Aromatic Hydrocarbons[3]	Surface Grab	EPA 8270C

Footnotes:
1 – PCBs is the sum of Arochlor-1016, Arochlor-1221, Arochlor-1232, Arochlor-1242, Arochlor-1248, Arochlor-1254, and Arochlor-1260.
2 – DDT is the sum of 4,4' DDT, 2,4' DDT, 4,4'DDE, 2,4' DDE, 4,4' DDD, and 2,4' DDD
3 – PAHs is the um of acenaphthene, anthracene, 1,2-benzanthracene, 3,4-benzofluoranthene, benzo(k)fluoranthene, 1,12-benzoperylene, benzo(a)pyrene, chrysene, dibenzo(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, and pyrene.

Analytical laboratory reports are included in Attachment 3 and Attachment 4 of the Dominguez Channel Estuary April 2020 Sediment Monitoring Report. All of the sediment monitoring parameters listed in Table 1.0 were analytically validated except for Sediment Grain Size and Chronic Toxicity. Data from these analyses do not qualify for environmental data validation guidance procedures. As a result, sediment grain size and chronic toxicity data was assessed for completion using Chain of Custody records and field sample preservation guidelines. Detailed analytical validation for chronic toxicity is provided in the Sediment Bioassay Data Validation Report in Attachment 6 of the Dominguez Channel Estuary April 2020 Sediment Monitoring Report.

Analytical data validation for organic/inorganic parameters determinations are included in the *Dominguez Channel Estuary Sediment Monitoring Organic/Inorganic Analytical Data Validation Form* in Attachment I included in this report.

1.1 Data Assessment

Analytical data validation consisted of evaluating laboratory precision, laboratory accuracy, method compliance, and overall completeness of laboratory data provided. Based on this assessment, it was determined that data obtained for the April 30, 2020 sediment samples at SED-004, SED-005, SED-006, and SED-007 is acceptable. Data components reviewed during the data review process included:

- Chain of Custody records and holding times
- Sample integrity/case narratives
- Sample results, reporting limits, dilution factors
- Laboratory QA/QC data

A summary of the sediment samples collected are provided in Table 1.0 below:

Table 2.0 – Dominguez Channel Sediment Samples			
Sample ID	Sample Date	Sample Time	Laboratory ID
SED-004	April 30, 2020	16:10	570-27181-1
SED-005	April 30, 2020	14:30	570-27181-2
SED-006	April 30, 2020	12:30	570-27181-3
SED-007	April 30, 2020	11:04	570-27181-4

1.2 Overall Data Review Narrative

Analytical data was assessed for precision, accuracy, method compliance and overall completeness. Data review determined these components to be acceptable. However, as noted in the attached data validation form, the Matrix Spike (MS)/Matrix Spike Duplicate (MSD) recoveries in QA/QC samples for PAHs, PCBs and Pesticides were outside the control limits. Since associated Laboratory Control Sample (LCS)/Laboratory Control Sample Duplicates (LCSD) recoveries were within acceptance limits, the data was qualified and deemed acceptable. In addition, the samples from sampling station SED-004, SED-005 and SED-006 experienced weathering or other environmental processes. As a result, the weathered patterns obtained from these sample stations were quantified to the closest Arochlor laboratory standard. Arochlor concentrations reported in the laboratory report should be taken as estimations.

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Attachment I

Dominguez Channel Estuary Sediment Monitoring

Inorganic/Organic Analytical Validation Form

Tesoro Refining & Marketing LLC
Los Angeles Refinery - Carson Operations
Dominguez Channel Estuary Sediment Monitoring Organic/Inorganic Analytical Data Validation Form

PROJECT INFORMATION

Project Name: Dominguez Channel Sediment Sampling
Analytical Laboratories: Eurofins Calscience, Inc.
Aquatic Bioassays & Consulting Laboratories Inc.
Sample Collection Date: April 30, 2020
Sample Collection Locations: SED-004, SED-005, SED-006, SED-007

Data Validator: Ana Horn
Validation Date: September 11, 2020
Signature: Ana Horn

SEDIMENT MONITORING PARAMETERS

Parameters	Sample Type	Analytical Method	Holding Times	Parameter Validation Comments:
Cadmium, Total Recoverable	Surface Grab	EPA 6020B	180 days	All sediment monitoring parameters were analytically validated except for Sediment Grain Size and Chronic Toxicity. Data from these analyses do not qualify for environmental data validation guidance procedures. Grain size and chronic toxicity data was assessed for completion based on Chain of Custody records and field sample preservation procedures.
Chlordane	Surface Grab	EPA 8081A	14 days	
Chromium, Total	Surface Grab	EPA 6020B	180 days	
Copper, Total Recoverable	Surface Grab	EPA 6020B	180 days	
Lead, Total Recoverable	Surface Grab	EPA 6020B	180 days	
Mercury, Total Recoverable	Surface Grab	EPA 7471A	180 days	
Nickel, Total Recoverable	Surface Grab	EPA 6020B	180 days	
Zinc, Total Recoverable	Surface Grab	EPA 6020B	180 days	
PCBs	Surface Grab	EPA 8082A	14 days	
Sediment Grain Size	Surface Grab	ASTM D4464	-	
Chronic Toxicity	Surface Grab	-	-	
Pesticides	Surface Grab	EPA 8081A	14 days	
Total Organic Carbon	Surface Grab	EPA 9060A	28 days	
Total Petroleum Hydrocarbons	Surface Grab	EPA 8015B	14 days	
Tributyltin	Surface Grab	Krone et. Al.	14 days	
Polynuclear Aromatic Hydrocarbons	Surface Grab	EPA 8270C	14 days	

VALIDATION CRITERIA

1.Was the Chain of Custody (COC) form complete for all samples submitted?	☑ YES ☐ NO ☐ N/A	Comments: The Chain of Custody (COC) form submitted to the laboratory is complete. The COC includes sample location information, field parameter results, and laboratory personnel signatures denoting the date and time the samples were relinquished by the sampler and received by the laboratory.
2.Were ALL of the requested analyses specified in the COC completed by the laboratory?	☑ YES ☐ NO ☐ N/A	Comments: Laboratory analysis was performed in accordance with the methods requested in the COC.

Tesoro Refining & Marketing LLC Los Angeles Refinery - Carson Operations Dominguez Channel Estuary Sediment Monitoring Organic/Inorganic Analytical Data Validation Form		
3.Were samples received in good condition and appropriately preserved as required by each analysis?	☑ YES ☐ NO ☐ N/A	Comments: The samples were received by the laboratory on May 1, 2020. The samples arrived in good condition and were properly preserved. No sample receipt deficiencies were noted in the laboratory report Sample Job Narrative.
4.Were the reported analytical methods in compliance with the facility's NPDES permit and/or COC requests?	☑ YES ☑ NO ☐ N/A	Comments: All analytical methods were completed as requested in the COC and are in compliance with the facility's NPDES permit.
5.Were detection limits in accordance with the facility's NPDES permit or analytical method?	☑ YES ☐ NO ☐ N/A	Comments: The method detection limits and reporting limits were reported for each analytical method. Sediment results were primarily reported on a dry weight basis except for DDT analyzed by method 8081A and sediment particle size analyzed by method D4464. DDT and sediment particle size was reported on a wet weight basis.
6. Did the laboratory identify any deficiencies/non-conformances related to the analytical results?	☑ YES ☐ NO ☐ N/A	Comments: The Job Narrative included on page 4 of the laboratory report outlines QA/QC issues for results analyzed by method 8081A, 8082A and 8270C. Method 8082A was utilized ofr the analysis of polychlorinated biphenyls (PCBs). The laboratory reported that sediment samples at station SED-004, SED-005, and SED-006 experienced weathering. As a result, the PCBs in the sample did not closely match any of the laboratory's Aroclor standards used for instrument calibration. The samples were quantified based on the Arochlor standard closest to the sample's pattern. Therefore, the Arochlor identification and concenetrations reported for these stations should be considered estimates. Additional QA/QC issues are further discussed in the comment section to questions 14 and 16.
7. Were sample holding times met?	☑ YES ☐ NO ☐ N/A	Comments: Sample holding times were met for all analytical methods. The analytical methods and the corresponding holding time is provided in the Sediment Monitoring Parameter Table above.

Tesoro Refining & Marketing LLC Los Angeles Refinery - Carson Operations Dominguez Channel Estuary Sediment Monitoring Organic/Inorganic Analytical Data Validation Form		
8. Were correct concentration units reported?	☑ YES ☐ NO ☐ N/A	Comments: Analytical results are reported in the correct concentration units required for sediment sample matrices. Results are reported in varying units as follows: dry weight results reported in mg/kg include PAHs analyzed by method EPA 8270C, TPH analyzed by method 8015B, total metals analyzed by method 6020, mercury analyzed by method 7471A and total organic carbon analyzed by method 9060A. Results reported in dry weight as ug/kg included PCBs analyzed by method 8082. Results reported in wet weight as ug/kg included DDT analyzed by 8081A. This unit trend is consistent at all four sampling stations.
9. Were the reporting requirements for flagged data met?	☑ YES ☐ NO ☐ N/A	Comments: Reporting requirements for flagged data were met. Qualifiers included: J - result is less than R_ but greater than or equal to MDL and the result is approximate value p - The %RPD between the primary and confirmation column/detector is >40%. The lower value was reported F1 - MS and/or MSD recovery is outside acceptance limits F2 - MS/MSD RPD exceeds control limits X - Surrogate recoveries exceed control limits Data with the above qualifiers, except for J flag results, are discussed in the comment section to questions 14 and 16.
10. Does the laboratory report include results for only those constituents requested in the COC?	☐ YES ☑ NO ☐ N/A	Comments: The laboratory report includes results for the required parameters as included in Table E-7 of the NPDES Permit; however, the laboratory report includes 5 additional PAH results not requested in the COC at all four sampling stations. These additional PAHs include Acenaphthylene, 1-Methylnaphthalene, 2-Methylnaphthalene, Naphthalene, and Phenanthrene. Data for these parameters are not required and are therefore not accounted for in this data validation.

Tesoro Refining & Marketing LLC Los Angeles Refinery - Carson Operations Dominguez Channel Estuary Sediment Monitoring Organic/Inorganic Analytical Data Validation Form		
11. Were laboratory method blank samples free of target analyte contamination?	☑ YES ☐ NO ☐ N/A	Comments: Laboratory method blanks were free of target analyte for all parameters at all sampled stations.
12. Were instrument calibrations within method or data validation control limits?	☐ YES ☐ NO ☑ N/A	Comments: Instrument calibration data was not supplied in the analytical report and, therefore, not included in this analytical data validation analysis.
13. Were trip blank, field blank, and/or equipment rinse blank samples free of target analyte contamination?	☐ YES ☐ NO ☑ N/A	Comments: Not applicable. Trip blanks, field blanks and/or equipment rinse blank samples were not collected for this project.
14. Were surrogate recoveries within control limits?	☐ YES ☑ NO ☐ N/A	Comments: Surrogate recoveries are within control limits at all sampling stations including surrogates used for PAHs (method 8279C), tributyltin (Krone et al), TPH (method 8015B), PCBs (method 8082), metals (method 6020) and total organic carbon (9060A). Surrogate recoveries for Pesticides (method 8081A) were outside control limits at all sampling stations. Pesticide surrogate recoveries outside the control limits indicate interferences caused by the specific sample matrix. The laboratory control sample (LCS)/laboratory control sample duplicate (LCSD) indicate the laboratory's performance to successfully recover target analytes. Since the LCS/LCSD demonstrate recoveries within acceptance limits for the Pesticide analytes the analytical results are deemed acceptable.
15. Were laboratory control sample recoveries within control limits?	☑ YES ☐ NO ☐ N/A	Comments: Laboratory control sample recoveries were within acceptable control limits for all parameters.

Tesoro Refining & Marketing LLC Los Angeles Refinery - Carson Operations Dominguez Channel Estuary Sediment Monitoring Organic/Inorganic Analytical Data Validation Form		
16. Were Matrix Spike (MS) / Matrix Spike Duplicate (MSD) recoveries within control limits?	☐ YES ☑ NO ☐ N/A	Comments: The Matrix Spike (MS)/Matrix Spike Duplicate (MSD) recoveries were within control limits for TPH, metals, total organic carbon, and tribultyltin. The MS/MSD recovery for PAH preparation batch 570-56884 and 570-68220 and analytical batch 570-68220 were outside the control limits. The MS/MSD recovery for Pesticide preparation batch 570-69209 and 570-69126 and analytical batch 570-8894 were outside the control limits. Additionally, the MS/MSD recoveries for PCB preparation batch 570-66884 and 570-67132 and analytical batch 570-68205 were outside the control limits. The MS/MSD measures the effects of interferences caused by the specific sample matrix. Poor spike recoverires for MS/MSD samples indicates the sample matrix is causing interference issues. Since the associated laboratory control sample (LCS)/laboratory contro sample duplicate (LCSD) recoveries for PAHs, Pesticides and PCBs were within acceptable limits it is determined that the laboratory performance is within standards and, therefore, the results are deemed acceptable.
17. Were internal standards within method criteria for GC/MS sample analysis?	☐ YES ☐ NO ☑ N/A	Comments: Does not apply to this level of data validation. In addition, GC/MS internal standard data was not supplied in the analytical reports and was therefore not included in this data review.
18. Were 100% of the Electronic Data Deliverable (EDD) concentrations and reporting limits compared to the hardcopy data reports?	☐ YES ☑ NO ☐ N/A	Comments: No EDD was used for this project.

Tesoro Refining & Marketing LLC
Los Angeles Refinery - Carson Operations
Dominguez Channel Estuary Sediment Monitoring Organic/Inorganic Analytical Data Validation Form

PRECISION, ACCURACY, METHOD COMPLIANCE AND COMPLETENESS ASSESSMENT

Precision Determination:	☑ Acceptable	☐ Not Acceptable

Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. To evaluate laboratory duplicates for precision the Relative Percent difference (RPD) was used. RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD precision measurements were compared to laboratory QC limits and it was determined that RPDs were within the RPD limits, except for PAHs. The associated laboratory control sample / laboratory sample duplicate for this parameter, however, was within acceptance limits. Therefore, data precision obtained for all analyzed parameters was determined to be acceptable.

Accuracy Determination:	☑ Acceptable	☐ Not Acceptable

Comments: Accuracy is the closeness of a measured result to an accepted reference value usually measured as percent recoveries. Laboratory accuracy is a measure of system bias measured by evaluating Lab Control Samples (LCS), Lab Control Sample Duplicate (LCSD), matrix spikes (MS) and/or matrix spike duplicates (MSD), and organic system monitoring compound surrogate percent recoveries (%Rs). Data validation assessments revealed all LCS/LCSD were within acceptable criteria. MS and MSD recoveries were outside the acceptable range for PCBs, Pesticides and PAHs as discussed in Question 16. Due to the LCS/LCSD meeting applicable criteria, data accuracy for analyzed parameters was determined to be acceptable.

Method Compliance Determination:	☑ Acceptable	☐ Not Acceptable

Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits and laboratory blanks per method specific requirements. Assessment of these factors is presented above in questions 1, 2, 3 and 4. Data validation determined method compliance to be acceptable.

Completeness Determination:	☑ Acceptable	☐ Not Acceptable

Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Project completeness was performed by evaluating COC records, laboratory analytical methods, and detection limits as well as sample data results and QC summary reports. Data assessment for the collected samples determined the overall data completeness to be acceptable.

ATTACHMENT 6

SEDIMENT BIOASSAY
DATA VALIDATION REPORT

Tesoro Refining & Marketing Company LLC
Los Angeles Refinery – Carson Operations
Dominguez Channel Estuary
April 2020 Sediment Monitoring Report

Tesoro Refining & Marketing LLC
Los Angeles Refinery – Carson Operations
Sediment Bioassay Data Validation Report
April 2020

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Attachment:

Attachment I – Dominguez Channel Estuary Sediment Bioassay Data Validation Form

1.0 Chronic Toxicity Test Overview

The Tesoro Refining & Marketing Company LLC, Los Angeles Refinery – Carson Operations (herein facility) collected sediment samples at monitoring locations SED-004, SED-005, SED-006, and SED-007 as required in National Pollutant Discharge Elimination System (NPDES) No. CA0000680. Sediment samples for chronic toxicity testing were collected on April 30, 2020 and submitted to Aquatic Bioassay & Consulting Laboratories Inc. on May 1, 2020 for analysis. Aquatic Bioassay & Consulting Laboratories has Environmental Laboratory Accreditation Program (ELAP) Certification number 1907.

In accordance with NPDES No. CA0000680 Attachment E, Section V.A.4, chronic toxicity samples are required to undergo a species sensitivity screening by concurrently conducting three toxicity tests using the fish, invertebrate and alga species listed in the permit order. Based on the results of the species sensitivity screening, the single species exhibiting the highest percent effect is required to be used for routine monitoring during the permit cycle. The species listed in the permit order, however, are more commonly used to evaluate for effluent chronic toxicity rather than sediment toxicity. Therefore, with laboratory staff and Los Angeles Regional Water Quality Control Board guidance, a species sensitivity screening was conducted for chronic toxicity samples on September 25, 2019 using two different sediment species: *Eohaustorius estuarius* and *Mytilus galloprovincialis*. As explained in the September 25th sediment report, both sediment species exhibited no observed effect concentration to the sediment samples collected from Stations SED-005, SED-006 and SED-007. Given that both species exhibited no toxicity effect, the facility opted to utilize *Eohaustorius estuarius* in all future chronic toxicity testing. Therefore, sediment chronic toxicity samples collected on April 30, 2020 were tested using *Eohaustorius estuarius* in accordance with the guidelines prescribed in Methods for Assessing the Toxicity of Sediment Associated Contaminants with Estuarine and Marine Amphipods, Method EPA/600/R-94/025.

2.0 Data Review

A level 2 data verification protocol was used for bioassay validation. The level 2 data review compares bioassay testing holding conditions, test setup, test implementation, and test termination in accordance with bioassay protocols. As part of the level 2 data verification protocol the laboratory was expected to follow all internal quality control procedures as directed in the applicable analytical method. Outcome of the data review for each of the chronic toxicity tests performed is documented in the *Chronic Toxicity QA/QC Bioassay Data Validation Form* included in Attachment I of this report.

Sediment samples at Stations SED-004, SED-005, SED-006, and SED-007 were collected on April 30, 2020 by WGR Southwest Inc. All collected samples were preserved as required[1] and submitted to Aquatic Bioassay and Consulting Laboratories Inc. on May 1, 2020. Chronic toxicity tests for all four stations began on May 5, 2020 and

[1] Sediment samples were collected and preserved in accordance with the Surface Water Ambient Monitoring Program (SWAMP) standard operating procedure, *Collection of Water and Bed Sediment Samples with Associated Field Measurement and Physical Habitat in California, Version 1.1.*

concluded on May 15, 2020. A summary of data usability determinations for the chronic toxicity test performed are described in the following section.

3.0 *Eohaustorius estuarius* Chronic Toxicity Test

3.1 Sample Collection, Sample Preservation, Chain of Custody

Sediment samples for *E. estuarius* chronic toxicity testing were collected from Stations SED-004, SED-005, SED-006, and SED-007 using an Eckman dredge sampler. Sampling equipment was decontaminated prior to use at each station to prevent cross contamination. Field samples were handled with care in order to minimize sediment disturbance and prevent the loss of sample integrity, chemical speciation and chemical equilibrium. Collected samples were maintained at 4°C and a Chain of Custody documenting the collected samples was completed and submitted to Aquatic Bioassay & Consulting Laboratories Inc. Chronic toxicity testing was initiated for all samples within the required 14-day holding time for sample collection and analysis. Document review of sample collection, sample preservation and Chain of Custody procedures was deemed acceptable and in compliance with the facility's Waste Discharge Requirements (WDRs).

3.2 Test Setup

Chronic toxicity testing with *E. estuarius* was completed in accordance with EPA method 600/R-94-025. Organisms used for testing were field collected and supplied by Northwestern Amphipod in Oregon. Amphipods ranging in 3-5 mm in size were used, with at least twenty organisms per replicate. Test setup review is provided in the bioassay data validation form attached to this document. Based on a review of laboratory test setup procedures, test set up procedure were deemed acceptable and in compliance with EPA method requirements.

3.3 Test Implementation

Test implementation for chronic toxicity testing with *E. estuarius* was completed in accordance with EPA method 600/R-94/025. Water quality measurements were recorded during the duration of the test and were found to be in the acceptable range as specified in the test protocol. Ranges for the water quality measurements are provided in the QA/QC Checklist of Attachment I. No abnormal conditions were observed throughout the duration of the test. Thus, the test implementation was determined to be acceptable and in compliance with EPA method requirements.

3.3.1 Test Acceptability Criteria

3.3.1.1 Reference Toxicant

The reference toxicant used during *E. estuarius* chronic toxicity testing was unionized ammonia. The length of the reference toxicant test was 96 hours. All reference toxicant testing was within the two standard deviation quality control limit meeting the test acceptability criteria in compliance with EPA method requirements.

3.3.1.2 Negative Control Samples

Negative control samples were above the 90% mean acceptability survival criteria. As a result, the negative control sample results are considered acceptable at all sampled stations and in compliance with EPA method requirements.

3.4 Reporting

Bioassay results were delivered in a laboratory report documenting a summary of water quality results, reference toxicity results, test results, statistical calculations and percent mortality. Additional information regarding test setup/test implementation procedures was provided by the laboratory via email to complete the QA/QC bioassay data validation form. Overall, the reporting component presenting chronic toxicity test results for *E. estuarius* was deemed acceptable.

3.5 Overall Data Usability

Review of laboratory data indicated chronic toxicity testing was performed in accordance with EPA method 600/R-94/025 as documented in Attachment I. Through the bioassay laboratory report and additional clarification from the laboratory, the bioassay test results at all sample stations was deemed acceptable and in compliance with EPA method requirements.

Attachment I

Dominguez Channel Estuary

Sediment Bioassay Data Validation Form

Tesoro Refining & Marketing LLC
Los Angeles Refinery - Carson Operations
Dominguez Channel Estuary Chronic Toxicity QA/QC Bioassay Data Validation

PROJECT INFORMATION			
Project Name:	Dominguez Channel Sediment Sampling		
Analytical Laboratory:	Aquatic Bioassays & Consulting Laboratories Inc.		
Laboratory Technician:	Joe Freas		
Sample Collection Date:	April 30, 2020		
Sample Locations/Lab Number:	SED-004 / WGR0520.004 SED-005 / WGR0520.005 SED-006 / WGR0520.006 SED-007 / WGR0520.007		
Species/Test Method Referenced:	Eohaustorius estuarius EPA/600/R-94-025	**Test Duration:**	SED-004: May 5, 2020 @ 13:00 – May 15, 2020 13:00 (10 day duration) SED-005: May 5, 2020 @ 13:01 – May 15, 2020 13:01 (10 day duration) SED-006: May 5, 2020 @ 13:02 – May 15, 2020 13:02 (10 day duration) SED-007: May 5, 2020 @ 13:02 – May 15, 2020 13:02 (10 day duration)
Sample Matrix:	Sediment		
Type of Species:	Estuarine		
Data Validator:	Ana Horn		
Validation Date:	August 31, 2020		
Signature:	Ana Horn		
Problems Noted:	No problems or deficiencies identified. Chronic toxicity testing was performed in accordance with EPA method guidelines.		

EOHAUSTORIUS ESTUARIUS	
Completeness and Holding Conditions:	
Type of Samples Collected: Grab Sediment Samples	Number of Samples Analyzed: 4
Were samples maintained at 4°C and in the dark after collection? Yes	
Did chronic toxicity testing begin within 14 days of sample collection? Yes	
Holding conditions acceptable? Yes	
If holding conditions were not acceptable, explain: Not Applicable	
Quality of Test Organism, Collection and Acclimation:	
Who is the supplier of the test organisms?	Northwestern Amphipod in Oregon
Are organisms field collected or cultured?	Field Collected

Tesoro Refining & Marketing LLC Los Angeles Refinery - Carson Operations Dominguez Channel Estuary Chronic Toxicity QA/QC Bioassay Data Validation
If field collected:
Where was the collection location? Oregon
What was the organism collection date? Organism were collected on April 27, 2020. Organisms were received by the laboratory on April 29, 2020.
What was the water salinity and temperature at the time of collection? Water salinity at the time of collection was 30 ppt. Acclimation after collection began at 26ppt. Final acclimation in laboratory was from 26 ppt to 20 ppt decreasing at 2 ppt/day.
Was site sediment collected for holding and acclimation purposes? Yes, site sediment was collected and used for acclimation and negative control testing.
Additional Comments: Quality of test organisms, collection, and acclimation is deemed acceptable.
Field Collection Sorting Methods
Were healthy amphipods placed into 10 cm diameter finger bowls with 2 cm sieved site sediment and seawater of appropriate salinity? Yes, only healthy organisms were used for bioassay testing. Amphipods were placed in 10 cm finger bowls with sieved site sediment and checked for appropriate salinity.
Were organisms held for 2-10 days? Yes, organisms were held for 6 days prior to test initiation.
Was test sediment sieved through 2 mm sieve or forceps for predator removal? Yes, sediment was sieved through a 2 mm stainless sieve.
Was control sediment sieved twice through 0.5 mm? Yes
Did control sediment have a 4-hour settling period after each sieving? Yes
Test Initiation
Was salinity adjusted in all testing chambers? Yes
Was overlying ammonia detected? No overlying ammonia was detected during testing.
Were there at least 5 replicates per sample? Yes
Was there at least 20 animals per replicate? Yes
Was the organism length between 3-5 mm during test initiation? Yes, organism length was verified by use of caliper measurement.
Was the overlying water volume 800 mL? Yes
Were there any water quality adjustments? Yes, water quality measurements were collected during the duration of the test and are provided in the corresponding laboratory report.
Test Implementation
Photoperiod for 24 hours? Yes, continuous light was provided.
Was daily water quality monitoring conducted? Yes
What was the overlying daily temperature range (15°C)? The overlying daily temperature was between 14.7-14.85°C.
Was the daily salinity range 20+/-1 ppt? Yes, salinity range was 20ppt.
Was water renewal conducted? No, water remained static and was not renewed over the 10-day exposure period as required in the EPA method.

Tesoro Refining & Marketing LLC Los Angeles Refinery - Carson Operations Dominguez Channel Estuary Chronic Toxicity QA/QC Bioassay Data Validation	
Was the overlying daily pH between 7 – 8 standard units? Yes	
What was the overlying ammonia detection (ND)? No ammonia was detected during testing.	
Were appropriate test chambers used (1-liter glass containers with 10 cm diameter)? Yes	
Was water in each test chamber aerated overnight before start and throughout the test? Yes, overlying water was continuously aerated at 1bbl/sec during the test	
Did the water maintain at least more than 90% saturation of dissolved oxygen concentration? Yes	
Test Results and Analysis	
Were the number of amphipods reported for each replicate? Yes, 20 amphipods were used per replicate	
Was the percent mortality reported for each replicate? Yes	
Was the sample mean for survival reported? Yes, the mean control survival was 99-100%	
QA/QC Samples	
Positive Control	*Negative Control*
Length of reference toxicity test? 96 hours	Negative control response above 90% acceptability criteria? Yes
What reference toxicant was used? Unionized Ammonia	Mean control survival? 100%
Exposure concentrations? Exposure ammonia concentrations were 0, 15.6, 32.2, 62.5, 125.0, 250 mg/L	Did EC 50 fall within lab standards? Yes
Did EC 50 fall within lab standards? Yes	

Dominguez Channel Estuary
October 2020
Sediment Monitoring Report

Prepared for:
Tesoro Refining & Marketing Company LLC
Los Angeles Refinery – Carson Operations
1801 East Sepulveda Boulevard
Carson, CA 90745

Prepared by:
WGR Southwest, Inc.
11021 Winners Circle, Suite 101
Los Alamitos, CA 90720

Date:
December 1, 2020

TESORO REFINING & MARKETING COMPANY LLC
LOS ANGELES REFINERY – CARSON OPERATIONS
DOMINGUEZ CHANNEL ESTUARY SEDIMENT MONITORING REPORT 2020

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TABLES

Table 2.0: Sediment Monitoring Field Observation and Analyses

FIGURES

Figure 1: Dominguez Channel Estuary Sediment Monitoring Locations

ATTACHMENTS

Attachment 1: Sediment Monitoring Field Logs

Attachment 2: Sediment Monitoring Laboratory Result Summary Table

Attachment 3: Sediment Monitoring Aquatic Bioassay Analytical Laboratory Report

Attachment 4: Sediment Bioassay Data Validation Report

1.0 Introduction

On behalf of Tesoro Refining & Marketing Company LLC Los Angeles Refinery – Carson Operations (Tesoro LAR Carson), WGR Southwest, Inc. (WGR) conducted sediment monitoring of the Dominguez Channel Estuary in accordance with National Pollutant Discharge Elimination System Waste Discharge Requirements Permit Number CA0000680 Order Number R4-2015-0259 (WDR Permit). As required in Table E-7 of WDR Permit Attachment E, Monitoring and Reporting Program Number 5424 (MRP No. 5424), sediment monitoring is required at least once a year for all parameters and at least twice a year for Chronic Toxicity regardless of Tesoro LAR Carson discharge associated with the WDR Permit[1]. Therefore, this report constitutes sediment monitoring for the second event of 2020, where the sediment samples collected were analyzed for Chronic Toxicity and required monitoring (i.e. field observations and field analyses) was completed.

2.0 Sediment Monitoring

As shown in Figure 1, the WDR Permit designates seven sediment monitoring locations: SED-001, SED-002, SED-003, SED-004, SED-005, SED-006, and SED-007. WGR field personnel utilized an Ekman dredge and a Horiba U-50 Series Multi-Parameter Meter. According to historic Tesoro LAR Carson Sediment Monitoring Reports, samplers have been unable to collect sediment samples from SED-001 since 2003 and SED-002 since 2003.

Sediment monitoring was attempted at all designated sediment monitoring locations on October 8, 2020. As detailed in the field logs (see Attachment 1), sediment samples and associated monitoring could only be feasibly completed at five of the seven sediment monitoring locations. Table 2.0 provides a summary of the field observations and analyses.

Table 2.0: Sediment Monitoring Field Observation and Analyses

Sample ID	Field Observations			Field Analyses					
	Sediment Description	Biological Matter	Pollutants	pH (SU)	Salinity (PPT)	DO (mg/L)	SC (mS/Cm)	Turbidity (NTU)	Flow
SED-001	Not Sampled	Not Sampled	Not Sampled	--	--	--	--	--	--
SED-002	Not Sampled	Not Sampled	Not Sampled	--	--	--	--	--	--

[1] Tesoro LAR Carson did not discharge under the WDR Permit during the 2020 calendar year.

Table 2.0: Sediment Monitoring Field Observation and Analyses

Sample ID	Field Observations			Field Analyses					
	Sediment Description	Biological Matter	Pollutants	pH (SU)	Salinity (PPT)	DO (mg/L)	SC (mS/Cm)	Turbidity (NTU)	Flow
SED-003	Dark in color with shell, vegetation and debris, fine particles, light biological odor	Vegetation present	No trash present	7.63	24.8	6.02	39.0	0.1	--
SED-004	Dark in color with shells, vegetation and debris, rough particles, light biological odor	Vegetation present	No trash present	7.62	24.2	5.81	38.2	4.3	--
SED-005	Dark in color with vegetation/debris and trash, fine particles, strong biological odor	Vegetation present	Trash present	7.52	22.9	5.02	36.3	2.3	--
SED-006	Dark in color with vegetation/debris and trash, fine particles, strong biological order	Vegetation present	Trash present	7.28	21.4	4.9	34.2	2.4	--
SED-007	Dark in color with some vegetation/debris, shells, salty, strong biological odor	Vegetation present	No trash present	7.05	20.7	4.52	33.1	4.3	--

DO: Dissolved Oxygen
SC: Specific Conductance

3.0 Laboratory Results

Table 2.0 summarizes the field observations and analyses for the October 2020 sediment monitoring event. Laboratory results are summarized in Attachment 2. The Aquatic Bioassay laboratory report is in Attachment 3. A data validation report for this laboratory analytical report is in Attachment 4.

4.0 Executive Summary

Receiving water sediment monitoring and analysis was conducted independent of any discharge from Tesoro LAR Carson. Pollutant concentrations demonstrated in this report are not associated with any contribution from Tesoro LAR Carson to the receiving water. There are

no pollutant concentration limits associated with this type of sampling as prescribed by the WDR Permit. Receiving water sediment monitoring and analysis was completed in compliance with the WDR Permit Attachment E, MRP No. 5424. As noted in the Sediment Bioassay Data Validation Report included in Attachment 4, analytical data obtained for this sampling event was deemed acceptable. No instances of non-compliance were identified.

FIGURE 1

DOMINGUEZ CHANNEL ESTUARY
SEDIMENT MONITORING LOCATIONS

Tesoro Refining & Marketing Company LLC
Los Angeles Refinery – Carson Operations
Dominguez Channel Estuary
October 2020 Sediment Monitoring Report

Figure 1: Dominguez Channel Estuary Sediment Monitoring Locations

ATTACHMENT 1

SEDIMENT MONITORING
FIELD LOGS

Tesoro Refining & Marketing Company LLC
Los Angeles Refinery – Carson Operations
Dominguez Channel Estuary
October 2020 Sediment Monitoring Report

WGR Southwest, Inc. Field Log		Page 1 of 3 Date: 10-8-2020
Project Name: LARC Sediment 2020	Field Personnel: Amber Ballrot	
Project Number: 021, APC_01	Field Personnel: Dave Montelongo	
Field Conditions/Project Discrepancies: overcast then sunny 68 - 75°F light to moderate breeze		

Time	Field Notes
0630	Arrive @ office, load truck w/equipment, ensuring to properly
	secure items in truck bed for transport
	Conduct overall safety tailgate meeting
0700	Leave office and head to SED-007
0745	Arrive @ SED-007, weather overcast. Water in channel,
	vegetation and some trash along embankment
	walk 94 ft from SE corner of bridge towards center
	of bridge for sample collection
	water level is 25 ft from top of bridge walkway
	water is slightly murky, cannot see bottom
	sediment dark in color w/some vegetation/debris, very fine particles, shells
	salty w/ bio decomp.
	23.1°C, 7.05 pH, 33.1 mS/Cm, 9.3 NTU, 4.52 mg/L DO,
	20.7 ppt
	clean up and decon equipment
0830	Leave SED-007 for SED-006
0845	Arrive @ SED-006, weather overcast. water in channel,
	vegetation and some trash along embankment
	walk 119 ft from NW corner of bridge towards center
	of bridge for sample collection
	water level is 25 ft from top of bridge walkway concrete railing
	water is slightly murky, cannot see bottom
	sediment dark in color w/some veg/debris and trash, fine particles,
	smells mostly of bio decomp.
	22.67°C, 7.28 pH, 34.2 mS/Cm, 2.4 NTU, 4.9 mg/L DO,
	21.4 ppt
	clean up and decon equipment
0915	take break
0930	Leave SED-006 for SED-005
0940	Arrive SED-005, weather overcast. water in channel,
	vegetation and some trash along embankment

WGR Southwest, Inc. Field Log		Page 2 of 3 Date: 10-8-2020
Project Name: LARC Sediment 2020	Field Personnel: Amber Ballrot	
Project Number: 021 APC.01	Field Personnel: Dave Montelongo	
Field Conditions/Project Discrepancies: See page 1		

Time	Field Notes
	walk 103 ft from NE corner of bridge towards center of bridge for sample collection
	water level is 22 ft from top of bridge walkway
	water is murky, cannot see bottom
	sediment dark in color w/ veg. /debris and trash, fine particles
	smells strongly of bio. decomp.
	22.41°C 7.52 pH, 36.3 mS/cm, 23 NTU, 5.02 mg/L DO
	22.9 ppt
	clean up and decon equipment
1015	leave SED-005 for SED-004
1030	arrive SED-004, weather slightly overcast, sun coming out
	water in channel, vegetation and trash along embankment
	walk 89 ft from SE corner of bridge toward center of bridge for sample collection
	water level is 20 ft from top of bridge walkway concrete railing
	water is murky, cannot see bottom
	sediment dark in color w/ shells, veg + debris, rough particles
	smells lightly of bio. decomp
	sediment sample not full desired volume due to dredge issues
	22.95°C, 7.62 pH, 36.2 mS/cm, 43 NTU, 5.81 mg/L DO
	29.2 ppt
	clean up and decon. equipment
1145	leave SED-004 for SED-003
	arrive SED-003, weather barely overcast, sun shining
	water in channel, vegetation and trash along embankment
	walk 104 ft from NE corner of bridge toward center of bridge for sample collection
	water level is 19 ft from bridge walkway
	water is murky, cannot see bottom, heavy rippling from wind
	sediment dark in color w/ shells, veg + debris, fine particles
	smells lightly of bio. decomp.

WGR Southwest, Inc. Field Log		Page 3 of 3
		Date: 10-8-2020
Project Name: LARC Sediment 2020	Field Personnel: Amber Ballrot	
Project Number: 021 APC 01	Field Personnel: Dave Montelongo	

Field Conditions/Project Discrepancies:

See page 1

Time	Field Notes
	23.19°C, 7.63 pH, 39.0 mS/cm, 0.1 NTU, 6.02 mg/L DO, 29.8 ppt
	cleanup and decon equipment
1230	leave SED-003 for SED-002
	drive by SED-002 area, sample point still inaccessible due to fences, move on to SED-001
1245	arrive SED-001, weather sunny
	water in channel, vegetation and trash along embankment
	heavy rippling from wind
	walk 637 ft from NE corner of bridge towards center of bridge for sample collection
	water level is 51 feet from bridge walkway concrete railing
	water is murky, cannot see bottom
	attempt 4-5 times to collect any sediment, none collected
	cease attempts and pack up equipment
1315	leave SED-001 for office
1400	~~return~~ arrive @ office - end of field sampling day

1315
1400

ATTACHMENT 2

SEDIMENT MONITORING
LABORATORY RESULT SUMMARY TABLE

Sample ID	SED-001	SED-002	SED-003	SED-004	SED-005	SED-006	SED-007
Date Sampled	NS	NS	10/8/2020	10/8/2020	10/8/2020	10/8/2020	10/8/2020
Time Sampled	NS	NS	11:45	10:45	9:50	8:55	8:00
Total Metals							
Cadmium (EPA 6020) (mg/Kg)	NS	NS	NR	NR	NR	NR	NR
Chromium (EPA 6020) (mg/Kg)	NS	NS	NR	NR	NR	NR	NR
Copper (EPA 6020) (mg/Kg)	NS	NS	NR	NR	NR	NR	NR
Lead (EPA 6020) (mg/Kg)	NS	NS	NR	NR	NR	NR	NR
Nickel (EPA 6020) (mg/Kg)	NS	NS	NR	NR	NR	NR	NR
Zinc (EPA 6020) (mg/Kg)	NS	NS	NR	NR	NR	NR	NR
Mercury (EPA 7471A) (mg/Kg)	NS	NS	NR	NR	NR	NR	NR
Volatile/Semi-Volatile Organic Compounds							
Chlordane (EPA 8081A) (ug/Kg)	NS	NS	NR	NR	NR	NR	NR
DDT (EPA 8081A) (ug/Kg, sum of 4,4'-DDT, 2,4'-DDT, 4,4'-DDE, 2,4'-DDE, 4,4'-DDD, and 2,4'-DDD)	NS	NS	NR	NR	NR	NR	NR
PCBs (EPA 8082) (ug/Kg, sum of Arochlor 1016, Arochlor 1221, Arochlor 1232, Arochlor 1242, Arochlor 1248, Arochlor 1254, and Arochlor 1260)	NS	NS	NR	NR	NR	NR	NR
PAHs (EPA 8270C) (mg/Kg, sum of acenaphthene, anthracene, 1,2-benzanthracene, 3,4-benzofluoranthene, benzo(k)fluoranthene, 1,12-benzoperylene, benzo(a)pyrene, chrysene, dibenzo(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, and pyrene)	NS	NS	NR	NR	NR	NR	NR
Total Petroleum Hydrocarbons (EPA 8015B) (mg/Kg)	NS	NS	NR	NR	NR	NR	NR
Sediment Grain Size (ASTM D4464)	NR						
Total Organic Carbon (EPA 9060A) (mg/Kg)	NS	NS	NR	NR	NR	NR	NR
Tributyltin (Krone et al.) (ug/Kg)	NS	NS	NR	NR	NR	NR	NR
Chronic Toxicity							
Mytilus galloprovincialis (NOEC in %)	NS	NS	100%	100%	100%	100%	100%

NS = Not Sampled
NR = Not Required
ND = Non-Detect
NOEC = No Observed Effect Concentration

ATTACHMENT 3

SEDIMENT MONITORING
AQUATIC BIOASSAY
ANALYTICAL LABORATORY REPORT

aquatic bioassay & consulting laboratories, inc

November 30, 2020

Amber Ballrot
WGR Southwest, Inc.
1801 E. Sepulveda Blvd.
Carson, CA 90749

Dear Mrs.Ballrot

We are pleased to present the enclosed bioassay report. The test was conducted under guidelines prescribed in *Methods for Assessing the Toxicity of Sediment-associated Contaminants with Estuarine and Marine Amphipods, Method EPA/600/R-94/025.* Results were as follows:

CLIENT:	WGR Southwest, Inc.
SAMPLE I.D.:	SED-003
DATE RECEIVED:	10/9/2020
ABC LAB. NO.:	WGR1020.043

ACUTE EOHAUSTORIUS SURVIVAL BIOASSAY

NOEC	=	100.00 %
TUc	=	1.00
EC25	=	>100.00 %
EC50	=	>100.00 %

Yours very truly,

Scott Johnson
Laboratory Director

CETIS Summary Report

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	11-1061-3819	**Test Type:**	Survival-Reburial	**Analyst:**	Joe Freas
Start Date:	16 Oct-20 13:01	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
EndingDate:	26OCT-20 13:01	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Test Length:	10 Days	**Taxon:**	Malacostraca	**Source:**	Northwestern Aquatic Scienc **Age:**
Sample ID:	09-1150-6296	**Code:**	WGR1020.043	**Project:**	021.APC.01
Sample Date:	08 Oct-20 11:45	**Material:**	Sediment	**Source:**	Bioassay Report
Receipt Date:	09 Oct-20 15:03	**CAS (PC):**		**Station:**	SED-003
Sample Age:	8d 1h	**Client:**	WGR Southwest Inc		

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
08-3312-6127	Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	100% passed survival rate	U

Test Acceptability

				TAC Limits			
Analysis ID	**Endpoint**	**Attribute**	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
08-3312-6127	Survival Rate	Control Resp	0.99	0.9	>>	Yes	Passes Criteria

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	5	0.9900	0.9622	1.0180	0.9500	1.0000	0.0100	0.0224	2.26%	0.00%
100		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	-1.01%

Survival Rate Detail — MD5: 20C171270BD920038C743B1A5C61F036

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	1.0000	0.9500	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000

Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	20/20	19/20	20/20	20/20	20/20
100		20/20	20/20	20/20	20/20	20/20

CETIS Analytical Report

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	08-3312-6127	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.7
Analyzed:	19 Nov-20 15:23	**Analysis:**	Nonparametric-Two Sample	**Status Level:**	1
Edit Date:	19 Nov-20 15:22	**MD5 Hash:**	20C171270BD92003BC743B1A5C61F036	**Editor ID:**	007-979-628-1
Batch ID:	11-1061-3819	**Test Type:**	Survival-Reburial	**Analyst:**	Joe Freas
Start Date:	16 Oct-20 13:01	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
EndingDate	26OCT-2020 13:01	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Test Length:	10-Days	**Taxon:**	Malacostraca	**Source:**	Northwestern Aquatic Scienc **Age:**
Sample ID:	09-1150-6296	**Code:**	WGR1020.043	**Project:**	021.APC.01
Sample Date:	08 Oct-20 11:45	**Material:**	Sediment	**Source:**	Bioassay Report
Receipt Date:	09 Oct-20 15:03	**CAS (PC):**		**Station:**	SED-003
Sample Age:	8d 1h	**Client:**	WGR Southwest Inc		

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	100% passed survival rate endpoint	2.12%

Wilcoxon Rank Sum Two-Sample Test

Control	vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		100	30	---	1	8	Exact	1.0000	Non-Significant Effect

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	0.99	0.9	>>	Yes	Passes Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0012877	0.0012877	1	1	0.3466	Non-Significant Effect
Error	0.0103014	0.0012877	8			
Total	0.0115891		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Levene Equality of Variance Test	7.111	11.26	0.0285	Equal Variances
	Mod Levene Equality of Variance Test	1	13.75	0.3559	Equal Variances
	Variance Ratio F Test				Indeterminate
Distribution	Anderson-Darling A2 Test	1.796	3.878	<1.0E-05	Non-Normal Distribution
	D'Agostino Skewness Test	3.335	2.576	0.0009	Non-Normal Distribution
	Kolmogorov-Smirnov D Test	0.4	0.3025	6.1E-05	Non-Normal Distribution
	Shapiro-Wilk W Normality Test	0.6247	0.7411	0.0001	Non-Normal Distribution

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	5	0.9900	0.9622	1.0000		0.9500	1.0000	0.0100	2.26%	0.00%
100		5	1.0000	1.0000	1.0000		1.0000	1.0000	0.0000	0.00%	-1.01%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	5	1.4360	1.3730	1.4990		1.3450	1.4590	0.0227	3.53%	0.00%
100		5	1.4590	1.4590	1.4590		1.4590	1.4590	0.0000	0.00%	-1.58%

Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	1.0000	0.9500	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000

Angular (Corrected) Transformed Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	1.4590	1.3450	1.4590	1.4590	1.4590
100		1.4590	1.4590	1.4590	1.4590	1.4590

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	08-3312-6127	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.7
Analyzed:	19 Nov-20 15:23	**Analysis:**	Nonparametric-Two Sample	**Status Level:**	1
Edit Date:	19 Nov-20 15:22	**MD5 Hash:**	20C171270BD920038C743B1A5C61F036	**Editor ID:**	007-979-628-1

CETIS Measurement Report

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	11-1061-3819	**Test Type:**	Survival-Reburial	**Analyst:**	Joe Freas
Start Date:	16 Oct-20 13:01	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	26OCT-2020 13:01	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Test Length:	10 Days	**Taxon:**	Malacostraca	**Source:**	Northwestern Aquatic Scienc **Age:**
Sample ID:	09-1150-6296	**Code:**	WGR1020.043	**Project:**	021 APC 01
Sample Date:	08 Oct-20 11:45	**Material:**	Sediment	**Source:**	Bioassay Report
Receipt Date:	09 Oct-20 15:03	**CAS (PC):**		**Station:**	SED-003
Sample Age:	8d 1h	**Client:**	WGR Southwest Inc.		

Dissolved Oxygen-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	10.05	9.415	10.69	10	10.1	0.03536	0.07073	0.70%	0
100		2	9.95	9.315	10.59	9.9	10	0.03536	0.07073	0.71%	0
Overall		4	10	9.87	10.13	9.9	10.1	0.04082	0.08165	0.82%	0 (0%)

pH-Units

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	7.9	7.884	7.916	7.9	7.9	0	0	0.00%	0
100		2	8.2	6.929	9.471	8.1	8.3	0.07071	0.1414	1.72%	0
Overall		4	8.05	7.745	8.355	7.9	8.3	0.09574	0.1915	2.38%	0 (0%)

Salinity-ppt

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	20	20	20	20	20	0	0	0.00%	0
100		2	20	20	20	20	20	0	0	0.00%	0
Overall		4	20	20	20	20	20	0	0	0.00%	0 (0%)

Temperature-°C

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	14.85	14.21	15.49	14.8	14.9	0.03539	0.07077	0.48%	0
100		2	14.85	14.21	15.49	14.8	14.9	0.03539	0.07077	0.48%	0
Overall		4	14.85	14.76	14.94	14.8	14.9	0.02887	0.05773	0.39%	0 (0%)

aquatic bioassay & consulting laboratories, inc

November 30, 2020

Amber Ballrot
WGR Southwest, Inc.
1801 E. Sepulveda Blvd.
Carson, CA 90749

Dear Mrs.Ballrot:

We are pleased to present the enclosed bioassay report. The test was conducted under guidelines prescribed in *Methods for Assessing the Toxicity of Sediment-associated Contaminants with Estuarine and Marine Amphipods, Method EPA/600/R-94/025.* Results were as follows:

CLIENT:	WGR Southwest, Inc.
SAMPLE I.D.:	SED-004
DATE RECEIVED:	10/9/2020
ABC LAB. NO.:	WGR1020.044

ACUTE EOHAUSTORIUS SURVIVAL BIOASSAY

NOEC	=	100.00 %
TUc	=	1.00
EC25	=	>100.00 %
EC50	=	>100.00 %

Yours very truly,

Scott Johnson
Laboratory Director

CETIS Summary Report

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	17-6653-2202	**Test Type:**	Survival-Reburial	**Analyst:**	Joe Freas
Start Date:	16 Oct-20 13:02	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	26 Oct-20 13:02	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Test Length:	10d 0h	**Taxon:**	Malacostraca	**Source:**	Northwestern Aquatic Scienc **Age:**
Sample ID:	18-5161-8008	**Code:**	WGR1020.044	**Project:**	021.APC.01
Sample Date:	08 Oct-20 10:45	**Material:**	Sediment	**Source:**	Bioassay Report
Receipt Date:	09 Oct-20 15:03	**CAS (PC):**		**Station:**	SED-004
Sample Age:	8d 2h	**Client:**	WGR Southwest Inc		

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
04-7891-8558	Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	100% passed survival rate	1

Test Acceptability

				TAC Limits			
Analysis ID	**Endpoint**	**Attribute**	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
04-7891-8558	Survival Rate	Control Resp	0.99	0.9	>>	Yes	Passes Criteria

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	5	0.9900	0.9622	1.0180	0.9500	1.0000	0.0100	0.0224	2.26%	0.00%
100		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	-1.01%

Survival Rate Detail — MD5: 20C171270BD920038C743B1A5C61F036

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	1.0000	0.9500	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000

Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	20/20	19/20	20/20	20/20	20/20
100		20/20	20/20	20/20	20/20	20/20

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	04-7891-8558	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.7
Analyzed:	19 Nov-20 15:32	**Analysis:**	Nonparametric-Two Sample	**Status Level:**	1
Edit Date:	19 Nov-20 15:31	**MD5 Hash:**	20C1712708D920038C743B1A5C61F036	**Editor ID:**	007-979-628-1
Batch ID:	17-6653-2202	**Test Type:**	Survival-Reburial	**Analyst:**	Joe Freas
Start Date:	16 Oct-20 13:02	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	26 Oct-20 13:02	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Test Length:	10d 0h	**Taxon:**	Malacostraca	**Source:**	Northwestern Aquatic Scienc **Age:**
Sample ID:	18-5161-8008	**Code:**	WGR1020.044	**Project:**	021.APC.01
Sample Date:	08 Oct-20 10:45	**Material:**	Sediment	**Source:**	Bioassay Report
Receipt Date:	09 Oct-20 15:03	**CAS (PC):**		**Station:**	SED-004
Sample Age:	8d 2h	**Client:**	WGR Southwest Inc.		

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	100% passed survival rate endpoint	2.12%

Wilcoxon Rank Sum Two-Sample Test

Control	vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		100	30	---	1	8	Exact	1.0000	Non-Significant Effect

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	0.99	0.9	>>	Yes	Passes Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0012877	0.0012877	1	1	0.3466	Non-Significant Effect
Error	0.0103014	0.0012877	8			
Total	0.0115891		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Levene Equality of Variance Test	7.111	11.26	0.0285	Equal Variances
	Mod Levene Equality of Variance Test	1	13.75	0.3559	Equal Variances
	Variance Ratio F Test				Indeterminate
Distribution	Anderson-Darling A2 Test	1.796	3.878	<1.0E-05	Non-Normal Distribution
	D'Agostino Skewness Test	3.335	2.576	0.0009	Non-Normal Distribution
	Kolmogorov-Smirnov D Test	0.4	0.3025	6.1E-05	Non-Normal Distribution
	Shapiro-Wilk W Normality Test	0.6247	0.7411	0.0001	Non-Normal Distribution

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	5	0.9900	0.9622	1.0000		0.9500	1.0000	0.0100	2.26%	0.00%
100		5	1.0000	1.0000	1.0000		1.0000	1.0000	0.0000	0.00%	-1.01%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	5	1.4360	1.3730	1.4990		1.3450	1.4590	0.0227	3.53%	0.00%
100		5	1.4590	1.4580	1.4590		1.4590	1.4590	0.0000	0.00%	-1.58%

Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	1.0000	0.9500	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000

Angular (Corrected) Transformed Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	1.4590	1.3450	1.4590	1.4590	1.4590
100		1.4590	1.4590	1.4590	1.4590	1.4590

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	04-7891-8558	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.7
Analyzed:	19 Nov-20 15:32	**Analysis:**	Nonparametric-Two Sample	**Status Level:**	1
Edit Date:	19 Nov-20 15:31	**MD5 Hash:**	20C171270BD920038C743B1A5C61F036	**Editor ID:**	007-979-628-1

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	17-6653-2202	**Test Type:**	Survival-Reburial	**Analyst:**	Joe Freas
Start Date:	16 Oct-20 13:02	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	26 Oct-20 13:02	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Test Length:	10d 0h	**Taxon:**	Malacostraca	**Source:**	Northwestern Aquatic Scienc **Age:**
Sample ID:	18-5161-8008	**Code:**	WGR1020.044	**Project:**	021.APC.01
Sample Date:	08 Oct-20 10:45	**Material:**	Sediment	**Source:**	Bioassay Report
Receipt Date:	09 Oct-20 15:03	**CAS (PC):**		**Station:**	SED-004
Sample Age:	8d 2h	**Client:**	WGR Southwest Inc		

Dissolved Oxygen-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	10.05	9.415	10.69	10	10.1	0.03536	0.07073	0.70%	0
100		2	9.95	9.315	10.59	9.9	10	0.03536	0.07073	0.71%	0
Overall		4	10	9.87	10.13	9.9	10.1	0.04082	0.08165	0.82%	0 (0%)

pH-Units

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	7.9	7.884	7.916	7.9	7.9	0	0	0.00%	0
100		2	7.85	5.944	9.756	7.7	8	0.1061	0.2121	2.70%	0
Overall		4	7.675	7.675	8.075	7.7	8	0.06292	0.1258	1.60%	0 (0%)

Salinity-ppt

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	20	20	20	20	20	0	0	0.00%	0
100		2	20	20	20	20	20	0	0	0.00%	0
Overall		4	20	20	20	20	20	0	0	0.00%	0 (0%)

Temperature-°C

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	14.85	14.21	15.49	14.8	14.9	0.03539	0.07077	0.48%	0
100		2	14.85	14.21	15.49	14.8	14.9	0.03539	0.07077	0.48%	0
Overall		4	14.85	14.76	14.94	14.8	14.9	0.02887	0.05773	0.39%	0 (0%)

aquatic bioassay & consulting laboratories, inc

November 30, 2020

Amber Ballrot
WGR Southwest, Inc.
1801 E. Sepulveda Blvd.
Carson, CA 90749

Dear Mrs.Ballrot:

We are pleased to present the enclosed bioassay report. The test was conducted under guidelines prescribed in *Methods for Assessing the Toxicity of Sediment-associated Contaminants with Estuarine and Marine Amphipods, Method EPA/600/R-94/025.* Results were as follows:

CLIENT:	WGR Southwest, Inc.
SAMPLE I.D.:	SED-005
DATE RECEIVED:	10/9/2020
ABC LAB. NO.:	WGR1020.045

ACUTE EOHAUSTORIUS SURVIVAL BIOASSAY

NOEC	=	100.00 %
TUc	=	1.00
EC25	=	>100.00 %
EC50	=	>100.00 %

Yours very truly,

Scott Johnson
Laboratory Director

CETIS Summary Report

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	16-5839-8947	**Test Type:**	Survival-Reburial	**Analyst:**	Joe Freas
Start Date:	16 Oct-20 13:03	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	26 Oct-20 13:03	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Test Length:	10d 0h	**Taxon:**	Malacostraca	**Source:**	Northwestern Aquatic Scienc **Age:**
Sample ID:	20-2563-0493	**Code:**	WGR1020.045	**Project:**	021.APC.01
Sample Date:	08 Oct-20 09:50	**Material:**	Sediment	**Source:**	Bioassay Report
Receipt Date:	09 Oct-20 15:03	**CAS (PC):**		**Station:**	SED-005
Sample Age:	8d 3h	**Client:**	WGR Southwest Inc.		

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
11-2731-9195	Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.7778	100% passed survival rate	!

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
11-2731-9195	Survival Rate	Control Resp	0.99	0.9	>>	Yes	Passes Criteria

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	5	0.9900	0.9622	1.0180	0.9500	1.0000	0.0100	0.0224	2.26%	0.00%
100		5	0.9900	0.9622	1.0180	0.9500	1.0000	0.0100	0.0224	2.26%	0.00%

Survival Rate Detail — MD5: 7E8A5637EBEE138A679AD86161476EB3

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	1.0000	0.9500	1.0000	1.0000	1.0000
100		0.9500	1.0000	1.0000	1.0000	1.0000

Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	20/20	19/20	20/20	20/20	20/20
100		19/20	20/20	20/20	20/20	20/20

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	11-2731-9195	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.7
Analyzed:	19 Nov-20 15:46	**Analysis:**	Nonparametric-Two Sample	**Status Level:**	1
Edit Date:	19 Nov-20 15:44	**MD5 Hash:**	7E8A5637EBEE138A679AD86161476EB3	**Editor ID:**	007-979-628-1
Batch ID:	16-5839-8947	**Test Type:**	Survival-Reburial	**Analyst:**	Joe Freas
Start Date:	16 Oct-20 13:03	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	26 Oct-20 13:03	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Test Length:	10d 0h	**Taxon:**	Malacostraca	**Source:**	Northwestern Aquatic Scienc **Age:**
Sample ID:	20-2563-0493	**Code:**	WGR1020.045	**Project:**	021.APC.01
Sample Date:	08 Oct-20 09:50	**Material:**	Sediment	**Source:**	Bioassay Report
Receipt Date:	09 Oct-20 15:03	**CAS (PC):**		**Station:**	SED-005
Sample Age:	8d 3h	**Client:**	WGR Southwest Inc		

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	100% passed survival rate endpoint	2.76%

Wilcoxon Rank Sum Two-Sample Test

Control	vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		100	27.5	---	2	8	Exact	0.7778	Non-Significant Effect

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	0.99	0.9	>>	Yes	Passes Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.0206028	0.0025754	8			
Total	0.0206028		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Levene Equality of Variance Test	0	11.26	1.0000	Equal Variances
	Mod Levene Equality of Variance Test	0	13.75	1.0000	Equal Variances
	Variance Ratio F Test	1	23.15	1.0000	Equal Variances
Distribution	Anderson-Darling A2 Test	2.912	3.878	<1.0E-05	Non-Normal Distribution
	D'Agostino Skewness Test	2.495	2.576	0.0126	Normal Distribution
	Kolmogorov-Smirnov D Test	0.4824	0.3025	<1.0E-05	Non-Normal Distribution
	Shapiro-Wilk W Normality Test	0.5093	0.7411	<1.0E-05	Non-Normal Distribution

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	5	0.9900	0.9622	1.0000		0.9500	1.0000	0.0100	2.26%	0.00%
100		5	0.9900	0.9622	1.0000		0.9500	1.0000	0.0100	2.26%	0.00%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	5	1.4360	1.3730	1.4990		1.3450	1.4590	0.0227	3.53%	0.00%
100		5	1.4360	1.3730	1.4990		1.3450	1.4590	0.0227	3.53%	0.00%

Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	1.0000	0.9500	1.0000	1.0000	1.0000
100		0.9500	1.0000	1.0000	1.0000	1.0000

Angular (Corrected) Transformed Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	1.4590	1.3450	1.4590	1.4590	1.4590
100		1.3450	1.4590	1.4590	1.4590	1.4590

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	11-2731-9195	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.7
Analyzed:	19 Nov-20 15:46	**Analysis:**	Nonparametric-Two Sample	**Status Level:**	1
Edit Date:	19 Nov-20 15:44	**MD5 Hash:**	7E8A5637EBEE138A679AD86161476EB3	**Editor ID:**	007-979-628-1

CETIS Measurement Report

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	16-5839-8947	**Test Type:**	Survival-Reburial	**Analyst:**	Joe Freas
Start Date:	16 Oct-20 13:03	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	26 Oct-20 13:03	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Test Length:	10d 0h	**Taxon:**	Malacostraca	**Source:**	Northwestern Aquatic Scienc **Age:**
Sample ID:	20-2563-0493	**Code:**	WGR1020.045	**Project:**	021.APC.01
Sample Date:	08 Oct-20 09:50	**Material:**	Sediment	**Source:**	Bioassay Report
Receipt Date:	09 Oct-20 15:03	**CAS (PC):**		**Station:**	SED-005
Sample Age:	8d 3h	**Client:**	WGR Southwest Inc.		

Dissolved Oxygen-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	10.05	9.415	10.69	10	10.1	0.03536	0.07073	0.70%	0
100		2	9.95	9.315	10.59	9.9	10	0.03536	0.07073	0.71%	0
Overall		4	10	9.87	10.13	9.9	10.1	0.04082	0.08165	0.82%	0 (0%)

pH-Units

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	7.9	7.884	7.916	7.9	7.9	0	0	0.00%	0
100		2	7.8	6.529	9.071	7.7	7.9	0.07071	0.1414	1.81%	0
Overall		4	7.85	7.691	8.009	7.7	7.9	0.05	0.1	1.27%	0 (0%)

Salinity-ppt

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	20	20	20	20	20	0	0	0.00%	0
100		2	20	20	20	20	20	0	0	0.00%	0
Overall		4	20	20	20	20	20	0	0	0.00%	0 (0%)

Temperature-°C

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	14.85	14.21	15.49	14.8	14.9	0.03539	0.07077	0.48%	0
100		2	14.85	14.21	15.49	14.8	14.9	0.03539	0.07077	0.48%	0
Overall		4	14.85	14.76	14.94	14.8	14.9	0.02887	0.05773	0.39%	0 (0%)

aquatic bioassay & consulting laboratories, inc

November 30, 2020

Amber Ballrot
WGR Southwest, Inc.
1801 E. Sepulveda Blvd.
Carson, CA 90749

Dear Mrs.Ballrot:

We are pleased to present the enclosed bioassay report. The test was conducted under guidelines prescribed in *Methods for Assessing the Toxicity of Sediment-associated Contaminants with Estuarine and Marine Amphipods, Method EPA/600/R-94/025.* Results were as follows:

CLIENT:	WGR Southwest, Inc.
SAMPLE I.D.:	SED-006
DATE RECEIVED:	10/9/2020
ABC LAB. NO.:	WGR1020.046

ACUTE EOHAUSTORIUS SURVIVAL BIOASSAY

NOEC	=	100.00 %
TUc	=	1.00
EC25	=	>100.00 %
EC50	=	>100.00 %

Yours very truly,

Scott Johnson
Laboratory Director

CETIS Summary Report

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	00-4035-1759	**Test Type:**	Survival-Reburial	**Analyst:**	Joe Freas
Start Date:	16 Oct-20 13:04	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	26 Oct-20 13:04	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Test Length:	10d 0h	**Taxon:**	Malacostraca	**Source:**	Northwestern Aquatic Scienc **Age:**
Sample ID:	19-5265-2256	**Code:**	WGR1020.046	**Project:**	021.APC.01
Sample Date:	08 Oct-20 08:55	**Material:**	Sediment	**Source:**	Bioassay Report
Receipt Date:	09 Oct-20 15:03	**CAS (PC):**		**Station:**	SED-006
Sample Age:	8d 4h	**Client:**	WGR Southwest Inc		

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
05-4159-7461	Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.7778	100% passed survival rate	I

Test Acceptability

				TAC Limits			
Analysis ID	**Endpoint**	**Attribute**	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
05-4159-7461	Survival Rate	Control Resp	0.99	0.9	>>	Yes	Passes Criteria

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	5	0.9900	0.9622	1.0180	0.9500	1.0000	0.0100	0.0224	2.26%	0.00%
100		5	0.9900	0.9622	1.0180	0.9500	1.0000	0.0100	0.0224	2.26%	0.00%

Survival Rate Detail — MD5: E38F5ED130D079E98E484D2F2A2F4666

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	1.0000	0.9500	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	0.9500	1.0000

Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	20/20	19/20	20/20	20/20	20/20
100		20/20	20/20	20/20	19/20	20/20

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	05-4159-7461	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.7
Analyzed:	19 Nov-20 16:09	**Analysis:**	Nonparametric-Two Sample	**Status Level:**	1
Edit Date:	19 Nov-20 16:08	**MD5 Hash:**	E38F5ED130D079E98E484D2F2A2F4666	**Editor ID:**	007-979-628-1
Batch ID:	00-4035-1759	**Test Type:**	Survival-Reburial	**Analyst:**	Joe Freas
Start Date:	16 Oct-20 13:04	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	26 Oct-20 13:04	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Test Length:	10d 0h	**Taxon:**	Malacostraca	**Source:**	Northwestern Aquatic Scienc **Age:**
Sample ID:	19-5265-2256	**Code:**	WGR1020.046	**Project:**	021 APC 01
Sample Date:	08 Oct-20 08:55	**Material:**	Sediment	**Source:**	Bioassay Report
Receipt Date:	09 Oct-20 15:03	**CAS (PC):**		**Station:**	SED-006
Sample Age:	8d 4h	**Client:**	WGR Southwest Inc		

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	100% passed survival rate endpoint	2.76%

Wilcoxon Rank Sum Two-Sample Test

Control	vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		100	27.5	—	2	8	Exact	0.7778	Non-Significant Effect

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	0.99	0.9	>>	Yes	Passes Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.0206028	0.0025754	8			
Total	0.0206028		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Levene Equality of Variance Test	0	11.26	1.0000	Equal Variances
	Mod Levene Equality of Variance Test	0	13.75	1.0000	Equal Variances
	Variance Ratio F Test	1	23.15	1.0000	Equal Variances
Distribution	Anderson-Darling A2 Test	2.912	3.878	<1.0E-05	Non-Normal Distribution
	D'Agostino Skewness Test	2.495	2.576	0.0126	Normal Distribution
	Kolmogorov-Smirnov D Test	0.4824	0.3025	<1.0E-05	Non-Normal Distribution
	Shapiro-Wilk W Normality Test	0.5093	0.7411	<1.0E-05	Non-Normal Distribution

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	5	0.9900	0.9622	1.0000		0.9500	1.0000	0.0100	2.26%	0.00%
100		5	0.9900	0.9622	1.0000		0.9500	1.0000	0.0100	2.26%	0.00%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	5	1.4360	1.3730	1.4990		1.3450	1.4590	0.0227	3.53%	0.00%
100		5	1.4360	1.3730	1.4990		1.3450	1.4590	0.0227	3.53%	0.00%

Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	1.0000	0.9500	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	0.9500	1.0000

Angular (Corrected) Transformed Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	1.4590	1.3450	1.4590	1.4590	1.4590
100		1.4590	1.4590	1.4590	1.3450	1.4590

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	05-4159-7461	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.7
Analyzed:	19 Nov-20 16:09	**Analysis:**	Nonparametric-Two Sample	**Status Level:**	1
Edit Date:	19 Nov-20 16:08	**MD5 Hash:**	E38F5ED130D079E98E484D2F2A2F4666	**Editor ID:**	007-979-628-1

CETIS Measurement Report

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	00-4035-1759	**Test Type:**	Survival-Reburial	**Analyst:**	Joe Freas
Start Date:	16 Oct-20 13:04	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	26 Oct-20 13:04	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Test Length:	10d 0h	**Taxon:**	Malacostraca	**Source:**	Northwestern Aquatic Scienc **Age:**
Sample ID:	19-5265-2256	**Code:**	WGR1020.046	**Project:**	021.APC.01
Sample Date:	08 Oct-20 08:55	**Material:**	Sediment	**Source:**	Bioassay Report
Receipt Date:	09 Oct-20 15:03	**CAS (PC):**		**Station:**	SED-006
Sample Age:	8d 4h	**Client:**	WGR Southwest Inc.		

Dissolved Oxygen-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	10.05	9.415	10.69	10	10.1	0.03536	0.07073	0.70%	0
100		2	9.95	9.315	10.59	9.9	10	0.03536	0.07073	0.71%	0
Overall		4	10	9.87	10.13	9.9	10.1	0.04082	0.08165	0.82%	0 (0%)

pH-Units

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	7.9	7.084	7.916	7.9	7.9	0	0	0.00%	0
100		2	7.9	6.629	9.171	7.8	8	0.07071	0.1414	1.79%	0
Overall		4	7.9	7.77	8.03	7.8	8	0.04082	0.08165	1.03%	0 (0%)

Salinity-ppt

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	20	20	20	20	20	0	0	0.00%	0
100		2	20	20	20	20	20	0	0	0.00%	0
Overall		4	20	20	20	20	20	0	0	0.00%	0 (0%)

Temperature-°C

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	14.85	14.21	15.49	14.8	14.9	0.03539	0.07077	0.48%	0
100		2	14.85	14.21	15.49	14.8	14.9	0.03539	0.07077	0.48%	0
Overall		4	14.85	14.76	14.94	14.8	14.9	0.02887	0.05773	0.39%	0 (0%)

aquatic bioassay & consulting laboratories, inc

November 30, 2020

Amber Ballrot
WGR Southwest, Inc.
1801 E. Sepulveda Blvd.
Carson, CA 90749

Dear Mrs.Ballrot:

We are pleased to present the enclosed bioassay report. The test was conducted under guidelines prescribed in *Methods for Assessing the Toxicity of Sediment-associated Contaminants with Estuarine and Marine Amphipods, Method EPA/600/R-94/025.* Results were as follows:

CLIENT:	WGR Southwest, Inc.
SAMPLE I.D.:	SED-007
DATE RECEIVED:	10/9/2020
ABC LAB. NO.:	WGR1020.047

ACUTE EOHAUSTORIUS SURVIVAL BIOASSAY

NOEC	=	100.00 %
TUc	=	1.00
EC25	=	>100.00 %
EC50	=	>100.00 %

Yours very truly,

Scott Johnson
Laboratory Director

CETIS Summary Report

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	14-5549-5995	**Test Type:**	Survival-Reburial	**Analyst:**	Joe Freas
Start Date:	16 Oct-20 13:05	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	26 Oct-20 13:05	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Test Length:	10d 0h	**Taxon:**	Malacostraca	**Source:**	Northwestern Aquatic Scienc **Age:**
Sample ID:	20-4615-2857	**Code:**	WGR1020.047	**Project:**	021.APC.01
Sample Date:	08 Oct-20 08:00	**Material:**	Sediment	**Source:**	Bioassay Report
Receipt Date:	09 Oct-20 15:03	**CAS (PC):**		**Station:**	SED-007
Sample Age:	8d 5h	**Client:**	WGR Southwest Inc		

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
13-1348-9319	Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	100% passed survival rate	!

Test Acceptability

				TAC Limits			
Analysis ID	**Endpoint**	**Attribute**	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
13-1348-9319	Survival Rate	Control Resp	0.99	0.9	>>	Yes	Passes Criteria

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	5	0.9900	0.9622	1.0180	0.9500	1.0000	0.0100	0.0224	2.26%	0.00%
100		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	-1.01%

Survival Rate Detail — MD5: 20C171270BD920038C743B1A5C81F036

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	1.0000	0.9500	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000

Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	20/20	19/20	20/20	20/20	20/20
100		20/20	20/20	20/20	20/20	20/20

CETIS Analytical Report

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	13-1348-9319	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.7
Analyzed:	19 Nov-20 16:22	**Analysis:**	Nonparametric-Two Sample	**Status Level:**	1
Edit Date:	19 Nov-20 16:21	**MD5 Hash:**	20C171270BD920038C743B1A5C61F036	**Editor ID:**	007-979-628-1
Batch ID:	14-5549-5995	**Test Type:**	Survival-Reburial	**Analyst:**	Joe Freas
Start Date:	16 Oct-20 13:05	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	26 Oct-20 13:05	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Test Length:	10d 0h	**Taxon:**	Malacostraca	**Source:**	Northwestern Aquatic Scienc **Age:**
Sample ID:	20-4615-2857	**Code:**	WGR1020.047	**Project:**	021.APC.01
Sample Date:	08 Oct-20 08:00	**Material:**	Sediment	**Source:**	Bioassay Report
Receipt Date:	09 Oct-20 15:03	**CAS (PC):**		**Station:**	SED-007
Sample Age:	8d 5h	**Client:**	WGR Southwest Inc.		

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	100% passed survival rate endpoint	2.12%

Wilcoxon Rank Sum Two-Sample Test

Control	vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		100	30	—	1	8	Exact	1.0000	Non-Significant Effect

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	0.99	0.9	>>	Yes	Passes Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0012877	0.0012877	1	1	0.3466	Non-Significant Effect
Error	0.0103014	0.0012877	8			
Total	0.0115891		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Levene Equality of Variance Test	7.111	11.26	0.0285	Equal Variances
	Mod Levene Equality of Variance Test	1	13.75	0.3559	Equal Variances
	Variance Ratio F Test				Indeterminate
Distribution	Anderson-Darling A2 Test	1.796	3.878	<1.0E-05	Non-Normal Distribution
	D'Agostino Skewness Test	3.335	2.576	0.0009	Non-Normal Distribution
	Kolmogorov-Smirnov D Test	0.4	0.3025	6.1E-05	Non-Normal Distribution
	Shapiro-Wilk W Normality Test	0.6247	0.7411	0.0001	Non-Normal Distribution

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	5	0.9900	0.9622	1.0000		0.9500	1.0000	0.0100	2.26%	0.00%
100		5	1.0000	1.0000	1.0000		1.0000	1.0000	0.0000	0.00%	-1.01%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	5	1.4360	1.3730	1.4990		1.3450	1.4590	0.0227	3.53%	0.00%
100		5	1.4590	1.4580	1.4590		1.4590	1.4590	0.0000	0.00%	-1.58%

Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	1.0000	0.9500	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000

Angular (Corrected) Transformed Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	1.4590	1.3450	1.4590	1.4590	1.4590
100		1.4590	1.4590	1.4590	1.4590	1.4590

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	13-1348-9319	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.7
Analyzed:	19 Nov-20 16:22	**Analysis:**	Nonparametric-Two Sample	**Status Level:**	1
Edit Date:	19 Nov-20 16:21	**MD5 Hash:**	20C171270BD920038C743B1A5C61F036	**Editor ID:**	007-979-628-1

CETIS Measurement Report

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	14-5549-5995	**Test Type:**	Survival-Reburial	**Analyst:**	Joe Freas
Start Date:	16 Oct-20 13:05	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	26 Oct-20 13:05	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Test Length:	10d 0h	**Taxon:**	Malacostraca	**Source:**	Northwestern Aquatic Scienc **Age:**
Sample ID:	20-4615-2857	**Code:**	WGR1020.047	**Project:**	021.APC.01
Sample Date:	08 Oct-20 08:00	**Material:**	Sediment	**Source:**	Bioassay Report
Receipt Date:	09 Oct-20 15:03	**CAS (PC):**		**Station:**	SED-007
Sample Age:	8d 5h	**Client:**	WGR Southwest Inc.		

Dissolved Oxygen-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	10.05	9.415	10.69	10	10.1	0.03536	0.07073	0.70%	0
100		2	10.05	9.415	10.69	10	10.1	0.03536	0.07073	0.70%	0
Overall		4	10.05	9.958	10.14	10	10.1	0.02887	0.05774	0.57%	0 (0%)

pH-Units

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	7.9	7.884	7.916	7.9	7.9	0	0	0.00%	0
100		2	7.9	5.359	10.44	7.7	8.1	0.1414	0.2828	3.58%	0
Overall		4	7.9	7.64	8.16	7.7	8.1	0.08165	0.1633	2.07%	0 (0%)

Salinity-ppt

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	20	20	20	20	20	0	0	0.00%	0
100		2	20	20	20	20	20	0	0	0.00%	0
Overall		4	20	20	20	20	20	0	0	0.00%	0 (0%)

Temperature-°C

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	14.85	14.21	15.49	14.8	14.9	0.03539	0.07077	0.48%	0
100		2	14.85	14.21	15.49	14.8	14.9	0.03539	0.07077	0.48%	0
Overall		4	14.85	14.76	14.94	14.8	14.9	0.02887	0.05773	0.39%	0 (0%)

aquatic bioassay & consulting laboratories, inc

96 Hour *Eohaustorius estuarius* Survival Bioassay - Standard Toxicant

DATE: 11/19/2020

STANDARD TOXICANT: Ammonium Chloride

ENDPOINT: SURVIVAL

UNIONIZED AMMONIA

NOEC = 0.4270mg/L

EC25 = 1.0630mg/L
EC50 = 1.9020mg/L

Yours very truly,

Scott Johnson
Laboratory Director

CETIS Summary Report

Reference Toxicant 96-h Acute Survival Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	20-8834-1019	**Test Type:**	Survival	**Analyst:**	Joe Freas
Start Date:	16 Oct-20 13:00	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	20 Oct-20 13:00	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Test Length:	96h	**Taxon:**	Malacostraca	**Source:**	Northwestern Aquatic Scienc **Age:**
Sample ID:	08-2994-6924	**Code:**	EOH101620	**Project:**	REF TOX
Sample Date:	16 Oct-20	**Material:**	Ammonia (Unionized)	**Source:**	Reference Toxicant
Receipt Date:		**CAS (PC):**		**Station:**	REF TOX
Sample Age:	13h	**Client:**	Internal Lab		

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	PMSD	S
15-8459-6569	Survival Rate	Steel Many-One Rank Sum Test		0.427	0.783	0.5782	8.25%	1

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	✓	Level	mg/L	95% LCL	95% UCL	S
07-6344-0004	Survival Rate	Linear Interpolation (ICPIN)		EC10	0.6406	0.5267	0.8684	1
				EC15	0.783	0.6203	0.9728	
				EC20	0.9232	0.6989	1.11	
				EC25	1.063	0.8615	1.32	
				EC40	1.484	1.133	2.067	
				EC50	1.902	1.191	2.444	

Survival Rate Summary

Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%
0.214		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%
0.427		4	0.9750	0.8954	1.0550	0.9000	1.0000	0.0250	0.0500	5.13%	2.50%
0.783		4	0.8500	0.7581	0.9419	0.8000	0.9000	0.0289	0.0577	6.79%	15.00%
1.554		4	0.5750	0.3748	0.7752	0.4000	0.7000	0.0629	0.1258	21.88%	42.50%
4.104		4	0.0250	-0.0546	0.1046	0.0000	0.1000	0.0250	0.0500	200.00%	97.50%

Survival Rate Detail — MD5: E090CBA9FEE7DC00F2F598E96AA501B7

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.0000	1.0000	1.0000	1.0000
0.214		1.0000	1.0000	1.0000	1.0000
0.427		0.9000	1.0000	1.0000	1.0000
0.783		0.8000	0.9000	0.9000	0.8000
1.554		0.6000	0.7000	0.6000	0.4000
4.104		0.0000	0.1000	0.0000	0.0000

Survival Rate Binomials

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	10/10	10/10	10/10	10/10
0.214		10/10	10/10	10/10	10/10
0.427		9/10	10/10	10/10	10/10
0.783		8/10	9/10	9/10	8/10
1.554		6/10	7/10	6/10	4/10
4.104		0/10	1/10	0/10	0/10

CETIS Analytical Report

Reference Toxicant 96-h Acute Survival Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	15-8459-6569	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.7
Analyzed:	19 Nov-20 16:27	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Edit Date:	19 Nov-20 16:26	**MD5 Hash:**	E090CBA9FEE7DC00F2F598E96AA501B7	**Editor ID:**	007-979-628-1
Batch ID:	20-8834-1019	**Test Type:**	Survival	**Analyst:**	Joe Freas
Start Date:	16 Oct-20 13:00	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	20 Oct-20 13:00	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Test Length:	96h	**Taxon:**	Malacostraca	**Source:**	Northwestern Aquatic Scienc **Age:**
Sample ID:	08-2994-6924	**Code:**	EOH101620	**Project:**	REF TOX
Sample Date:	16 Oct-20	**Material:**	Ammonia (Unionized)	**Source:**	Reference Toxicant
Receipt Date:		**CAS (PC):**		**Station:**	REF TOX
Sample Age:	13h	**Client:**	Internal Lab		

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	MSDu	PMSD
Angular (Corrected)	C > T	0.427	0.783	0.5782	—	0.08253	8.25%

Steel Many-One Rank Sum Test

Control	vs	Conc-mg/L	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		0.214	18	10	1	6	CDF	0.8333	Non-Significant Effect
		0.427	18	10	1	6	CDF	0.8105	Non-Significant Effect
		0.783*	10	10	0	6	CDF	0.0417	Significant Effect
		1.554*	10	10	0	6	CDF	0.0417	Significant Effect
		4.104*	10	10	0	6	CDF	0.0417	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4.54942	0.909884	5	149.9	<1.0E-05	Significant Effect
Error	0.109243	0.0060691	18			
Total	4.65866		23			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test				Indeterminate
	Levene Equality of Variance Test	3.69	4.248	0.0179	Equal Variances
	Mod Levene Equality of Variance Test	1.161	4.248	0.3658	Equal Variances
Distribution	Anderson-Darling A2 Test	0.6872	3.878	0.0728	Normal Distribution
	D'Agostino Kurtosis Test	1.282	2.576	0.1998	Normal Distribution
	D'Agostino Skewness Test	1.081	2.576	0.2799	Normal Distribution
	D'Agostino-Pearson K2 Omnibus Test	2.811	9.21	0.2452	Normal Distribution
	Kolmogorov-Smirnov D Test	0.2083	0.2056	0.0084	Non-Normal Distribution
	Shapiro-Wilk W Normality Test	0.9471	0.884	0.2347	Normal Distribution

Survival Rate Summary

Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
0.214		4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
0.427		4	0.9750	0.8954	1.0000	1.0000	0.9000	1.0000	0.0250	5.13%	2.50%
0.783		4	0.8500	0.7581	0.9419	0.8500	0.8000	0.9000	0.0289	6.79%	15.00%
1.554		4	0.5750	0.3748	0.7752	0.6000	0.4000	0.7000	0.0629	21.88%	42.50%
4.104		4	0.0250	0.0000	0.1046	0.0000	0.0000	0.1000	0.0250	200.00%	97.50%

Angular (Corrected) Transformed Summary

Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	1.4120	1.4120	1.4120	1.4120	1.4120	1.4120	0.0000	0.00%	0.00%
0.214		4	1.4120	1.4120	1.4120	1.4120	1.4120	1.4120	0.0000	0.00%	0.00%
0.427		4	1.3710	1.2420	1.5010	1.4120	1.2490	1.4120	0.0407	5.94%	2.89%
0.783		4	1.1780	1.0480	1.3080	1.1780	1.1070	1.2490	0.0410	6.95%	16.57%
1.554		4	0.8620	0.6581	1.0660	0.8861	0.6847	0.9912	0.0641	14.87%	38.95%
4.104		4	0.1995	0.0699	0.3292	0.1588	0.1588	0.3218	0.0407	40.84%	85.87%

Reference Toxicant 96-h Acute Survival Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	15-8459-6569	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.7
Analyzed:	19 Nov-20 16:27	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Edit Date:	19 Nov-20 16:26	**MD5 Hash:**	E090CBA9FEE7DC00F2F598E96AA501B7	**Editor ID:**	007-979-628-1

Survival Rate Detail

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.0000	1.0000	1.0000	1.0000
0.214		1.0000	1.0000	1.0000	1.0000
0.427		0.9000	1.0000	1.0000	1.0000
0.783		0.8000	0.9000	0.9000	0.8000
1.554		0.6000	0.7000	0.6000	0.4000
4.104		0.0000	0.1000	0.0000	0.0000

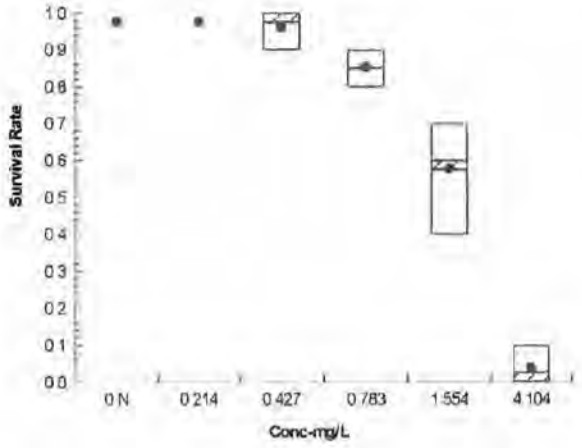
Angular (Corrected) Transformed Detail

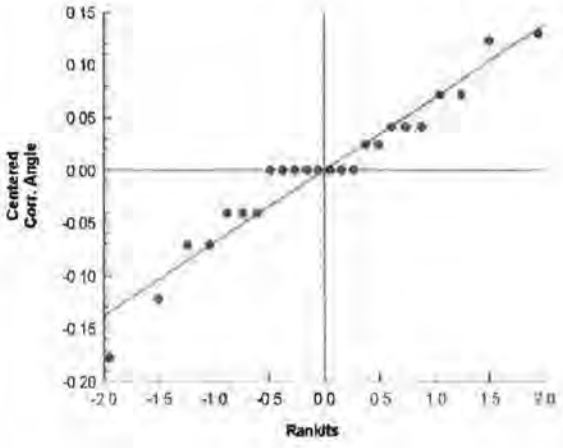
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.4120	1.4120	1.4120	1.4120
0.214		1.4120	1.4120	1.4120	1.4120
0.427		1.2490	1.4120	1.4120	1.4120
0.783		1.1070	1.2490	1.2490	1.1070
1.554		0.8861	0.9912	0.8861	0.6847
4.104		0.1588	0.3218	0.1588	0.1588

Survival Rate Binomials

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	10/10	10/10	10/10	10/10
0.214		10/10	10/10	10/10	10/10
0.427		9/10	10/10	10/10	10/10
0.783		8/10	9/10	9/10	8/10
1.554		6/10	7/10	6/10	4/10
4.104		0/10	1/10	0/10	0/10

Graphics





Reference Toxicant 96-h Acute Survival Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	07-6344-0004	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.7
Analyzed:	19 Nov-20 16:27	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1
Edit Date:	19 Nov-20 16:26	**MD5 Hash:**	E090CBA9FEE7DC00F2F598E96AA501B7	**Editor ID:**	007-979-628-1
Batch ID:	20-8834-1019	**Test Type:**	Survival	**Analyst:**	Joe Freas
Start Date:	16 Oct-20 13:00	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	20 Oct-20 13:00	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Test Length:	96h	**Taxon:**	Malacostraca	**Source:**	Northwestern Aquatic Scienc **Age:**
Sample ID:	08-2994-6924	**Code:**	EOH101620	**Project:**	REF TOX
Sample Date:	16 Oct-20	**Material:**	Ammonia (Unionized)	**Source:**	Reference Toxicant
Receipt Date:		**CAS (PC):**		**Station:**	REF TOX
Sample Age:	13h	**Client:**	Internal Lab		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	0	280	Yes	Two-Point Interpolation

Point Estimates

Level	mg/L	95% LCL	95% UCL
EC10	0.6406	0.5267	0.8684
EC15	0.783	0.6203	0.9728
EC20	0.9232	0.6989	1.11
EC25	1.063	0.8615	1.32
EC40	1.484	1.133	2.067
EC50	1.902	1.191	2.444

Survival Rate Summary — Calculated Variate(A/B) — Isotonic Variate

Conc-mg/L	Code	Count	Mean	Median	Min	Max	CV%	%Effect	A/B	Mean	%Effect
0	N	4	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	40/40	1.0000	0.00%
0.214		4	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	40/40	1.0000	0.00%
0.427		4	0.9750	1.0000	0.9000	1.0000	5.13%	2.50%	39/40	0.9750	2.50%
0.783		4	0.8500	0.8500	0.8000	0.9000	6.79%	15.00%	34/40	0.8500	15.00%
1.554		4	0.5750	0.6000	0.4000	0.7000	21.88%	42.50%	23/40	0.5750	42.50%
4.104		4	0.0250	0.0000	0.0000	0.1000	200.00%	97.50%	1/40	0.0250	97.50%

Survival Rate Detail

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.0000	1.0000	1.0000	1.0000
0.214		1.0000	1.0000	1.0000	1.0000
0.427		0.9000	1.0000	1.0000	1.0000
0.783		0.8000	0.9000	0.9000	0.8000
1.554		0.6000	0.7000	0.6000	0.4000
4.104		0.0000	0.1000	0.0000	0.0000

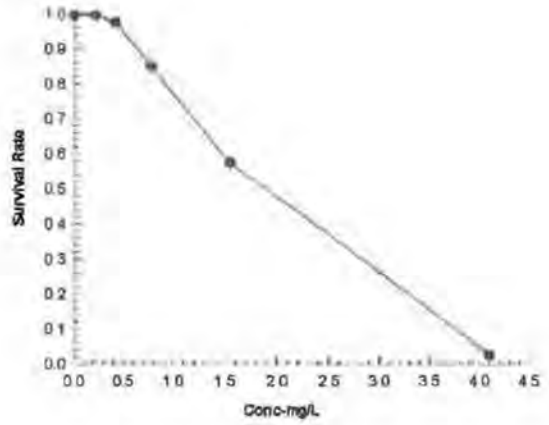
Survival Rate Binomials

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	10/10	10/10	10/10	10/10
0.214		10/10	10/10	10/10	10/10
0.427		9/10	10/10	10/10	10/10
0.783		8/10	9/10	9/10	8/10
1.554		6/10	7/10	6/10	4/10
4.104		0/10	1/10	0/10	0/10

Reference Toxicant 96-h Acute Survival Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	07-6344-0004	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.7
Analyzed:	19 Nov-20 16:27	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1
Edit Date:	19 Nov-20 16:26	**MD5 Hash:**	E090C8A9FEE7DC00F2F598E96AA501B7	**Editor ID:**	007-979-628-1

Graphics



CETIS Measurement Report

Reference Toxicant 96-h Acute Survival Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	20-8834-1019	**Test Type:**	Survival	**Analyst:**	Joe Freas
Start Date:	16 Oct-20 13:00	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	20 Oct-20 13:00	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Test Length:	96h	**Taxon:**	Malacostraca	**Source:**	Northwestern Aquatic Scienc **Age:**
Sample ID:	08-2994-6924	**Code:**	EOH101620	**Project:**	REF TOX
Sample Date:	16 Oct-20	**Material:**	Ammonia (Unionized)	**Source:**	Reference Toxicant
Receipt Date:		**CAS (PC):**		**Station:**	REF TOX
Sample Age:	13h	**Client:**	Internal Lab		

Dissolved Oxygen-mg/L

Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	6.85	6.215	7.485	6.8	6.9	0.03535	0.0707	1.03%	0
0.214		2	6.85	3.673	10.03	6.6	7.1	0.1768	0.3536	5.16%	0
0.427		2	7.1	4.559	9.641	6.9	7.3	0.1414	0.2828	3.98%	0
0.783		2	7.1	7.086	7.114	7.1	7.1	0	0	0.00%	0
1.554		2	6.95	6.315	7.585	6.9	7	0.03535	0.07071	1.02%	0
4.104		2	6.95	5.044	8.856	6.8	7.1	0.1061	0.2121	3.05%	0
Overall		12	6.967	6.848	7.086	6.6	7.3	0.05412	0.1875	2.69%	0 (0%)

pH-Units

Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	7.9	7.884	7.916	7.9	7.9	0	0	0.00%	0
0.214		2	7.9	7.884	7.916	7.9	7.9	0	0	0.00%	0
0.427		2	7.9	7.884	7.916	7.9	7.9	0	0	0.00%	0
0.783		2	7.9	7.884	7.916	7.9	7.9	0	0	0.00%	0
1.554		2	7.9	7.884	7.916	7.9	7.9	0	0	0.00%	0
4.104		2	7.9	7.884	7.916	7.9	7.9	0	0	0.00%	0
Overall		12	7.9	7.9	7.9	7.9	7.9	0	0	0.00%	0 (0%)

Salinity-ppt

Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	20	20	20	20	20	0	0	0.00%	0
0.214		2	20	20	20	20	20	0	0	0.00%	0
0.427		2	20	20	20	20	20	0	0	0.00%	0
0.783		2	20	20	20	20	20	0	0	0.00%	0
1.554		2	20	20	20	20	20	0	0	0.00%	0
4.104		2	20	20	20	20	20	0	0	0.00%	0
Overall		12	20	20	20	20	20	0	0	0.00%	0 (0%)

Temperature-°C

Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	14.85	14.21	15.49	14.8	14.9	0.03539	0.07077	0.48%	0
0.214		2	14.85	14.21	15.49	14.8	14.9	0.03539	0.07077	0.48%	0
0.427		2	14.85	14.21	15.49	14.8	14.9	0.03539	0.07077	0.48%	0
0.783		2	14.85	14.21	15.49	14.8	14.9	0.03539	0.07077	0.48%	0
1.554		2	14.85	14.21	15.49	14.8	14.9	0.03539	0.07077	0.48%	0
4.104		2	14.85	14.21	15.49	14.8	14.9	0.03539	0.07077	0.48%	0
Overall		12	14.85	14.82	14.88	14.8	14.9	0.01508	0.05222	0.35%	0 (0%)

Tesoro Los Angeles Refinery - Carson Operations

Facility Name	City, State (Facility)	Project Manager (Consultant)	Project No. (Consultant)	Laboratory Name
LA Refinery - Carson Operations	1801 E. Sepulveda Blvd., Carson CA 90749	Chelsea Dreyer	021.APC.01	Aquatic Bioassay 29 N Olive Street Ventura 93001 (805) 643-5621
Facility Contact Nate Busch	**Facility Telephone No.** (310) 847-3920	**Telephone No. (Consultant)** (562) 799-8510 ex. 1003	**Fax No. (Consultant)** (562) 799-8510	
Consultant Company WGR Southwest, Inc.	**Consultant Address** 11021 Winners Circle #101 Los Alamitos, California 90720			

Sample I.D.	Lab Sample No.	No. of Containers	Matrix: Soil	Water	Air	Other	Prsv.: Yes	No	Sampling Date	Sampling Time	*Eohaustorius estuarius* (EPA 600/R-94/025)	FIELD ANALYSES: pH (SU) [6.5-8.5]	Salinity (PSU, ppt)	Dissolved Oxygen (mg/L) [mean>7; single>5]	Specific Conductance (mS/cm)	Turbidity (NTU) [<50]	Flow (units =) [if possible]
~~SED-001~~		~~1~~	~~X~~				~~X~~				~~X~~						
~~SED-002~~		~~1~~	~~X~~				~~X~~				~~X~~						
SED-003		1	X				X		10/8/20	1145	X	7.63	24.8	6.02	39.0	0.1	-
SED-004		1	X				X		10/8/20	1045	X	7.62	24.2	5.81	38.2	4.3	-
SED-005		1	X				X		10/8/20	0950	X	7.52	22.9	5.02	36.3	2.3	-
SED-006		1	X				X		10/8/20	0865	X	7.28	21.9	4.9	34.2	2.9	-
SED-007		1	X				X		10/8/20	0800	X	7.05	20.8	4.52	33.1	4.3	-

Sample bottles required for each sample point:

(1) x 1-gallon plastic bag

Special Detection Limit/Reporting

Please report MDL and RL for all analytes

Duplicate samples must be analyzed at a frequency of 5%

Special QA/QC

Sub'd COC Attch'd:

REMARK

Email Results to:
nbusch@marathonpetroleum.com
cdreyer@wgr-sw.com
aballrot@wgr-sw.com

Sample Received Intact: Yes No

Temperature received: Ice No ice

Relinquished by SAMPLER (Print & Sign Name)	Date	Time	Received by (Print & Sign Name)
Dave Montelongo	10/09/20	1503	CHARIS SANIA
Relinquished by (Print & Sign Name)	**Date**	**Time**	**Received by LABORATORY (Print & Sign Name)**
			Lab Work No.

Revised 12/16/2019

ATTACHMENT 4

SEDIMENT BIOASSAY
DATA VALIDATION REPORT

Tesoro Refining & Marketing Company LLC
Los Angeles Refinery – Carson Operations
Dominguez Channel Estuary
October 2020 Sediment Monitoring Report

Tesoro Refining & Marketing LLC
Los Angeles Refinery – Carson Operations
Sediment Bioassay Data Validation Report

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2.0 Data Review 1

3.0 *Eohaustorius estuarius* Chronic Toxicity Test 2

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3.2 Test Setup 2
3.3 Test Implementation 2
3.3.1 Test Acceptability Criteria 3
3.4 Reporting 3
3.5 Overall Data Usability 3

Attachment:

Attachment I – Dominguez Channel Estuary Sediment Bioassay Data Validation Form

1.0 Chronic Toxicity Test Overview

The Tesoro Refining & Marketing Company LLC, Los Angeles Refinery – Carson Operations (herein facility) collected sediment samples at monitoring locations SED-003, SED-004, SED-005, SED-006, and SED-007 as required in National Pollutant Discharge Elimination System (NPDES) No. CA0000680. Sediment samples for chronic toxicity testing were collected on October 8, 2020 and submitted to Aquatic Bioassay & Consulting Laboratories Inc. on October 9, 2020 for analysis. Aquatic Bioassay & Consulting Laboratories has Environmental Laboratory Accreditation Program (ELAP) Certification number 1907.

In accordance with NPDES No. CA0000680 Attachment E, Section V.A.4, chronic toxicity samples are required to undergo a species sensitivity screening by concurrently conducting three toxicity tests using the fish, invertebrate and alga species listed in the permit order. Based on the results of the species sensitivity screening, the single species exhibiting the highest percent effect is required to be used for routine monitoring during the permit cycle. The species listed in the permit order, however, are more commonly used to evaluate effluent chronic toxicity rather than sediment toxicity. Therefore, with laboratory staff and Regional Water Quality Control Board guidance, a species sensitivity screening was conducted for chronic toxicity samples on September 25, 2019 using two different sediment species: *Eohaustorius estuarius* and *Mytilus galloprovincialis*. As explained in the September 25th sediment report, both sediment species exhibited no observed effect concentration to the sediment samples collected from Stations SED-005, SED-006 and SED-007. Given that both species exhibited no toxicity effect, the facility opted to utilize *Eohaustorius estuarius* in all future chronic toxicity testing. Therefore, sediment chronic toxicity samples collected on October 8, 2020 were tested using *Eohaustorius estuarius* in accordance with the guidelines prescribed in Methods for Assessing the Toxicity of Sediment Associated Contaminants with Estuarine and Marine Amphipods, Method EPA/600/R-94/025.

2.0 Data Review

A level 2 data verification protocol was used for bioassay validation. The level 2 data review compares bioassay testing holding conditions, test setup, test implementation, and test termination in accordance with bioassay protocols. As part of the level 2 data verification protocol the laboratory was expected to follow all internal quality control procedures as directed in the applicable analytical method. Outcome of the data review for each of the chronic toxicity tests performed is documented in the *Chronic Toxicity QA/QC Bioassay Data Validation Form* included in Attachment I of this report.

Sediment samples at Stations SED-003, SED-004, SED-005, SED-006, and SED-007 were collected on October 8, 2020 by WGR Southwest Inc. All collected samples were preserved as required and submitted to Aquatic Bioassay and Consulting Laboratories Inc. on October 9, 2020. Chronic toxicity tests for all five stations began on October 16,

2020 and concluded on October 26, 2020. A summary of data usability determinations for the chronic toxicity test performed are described in the following section.

3.0 *Eohaustorius estuarius* Chronic Toxicity Test

3.1 Sample Collection, Sample Preservation, Chain of Custody

Sediment samples for *E. estuarius* chronic toxicity testing were collected from Stations SED-003, SED-004, SED-005, SED-006, and SED-007 using an Eckman dredge sampler. Sampling equipment was decontaminated prior to use at each station to prevent cross contamination. Field samples were handled with care to minimize sediment disturbance and prevent the loss of sample integrity, chemical speciation and chemical equilibrium. Collected samples were maintained at 4°C and a Chain of Custody documenting the collected samples was completed and submitted to Aquatic Bioassay & Consulting Laboratories Inc. Chronic toxicity testing was initiated for all samples within the required 14-day holding time for sample collection and analysis. Document review of sample collection, sample preservation and Chain of Custody procedures was deemed acceptable and in compliance with the facility's Waste Discharge Requirements (WDRs).

3.2 Test Setup

Chronic toxicity testing with *E. estuarius* was completed in accordance with EPA method 600/R-94-025. Organisms used for testing were field collected and supplied by Northwestern Amphipod in Oregon. Amphipods ranging in 3-5 mm in size were used, with at least twenty organisms per replicate. Test setup review is provided in the bioassay data validation form attached to this document. Based on a review of laboratory test setup procedures, test set up procedure were deemed acceptable and in compliance with EPA method requirements.

3.3 Test Implementation

Test implementation for chronic toxicity testing with *E. estuarius* was completed in accordance with EPA method 600/R-94/025. Water quality measurements were recorded during the duration of the test and were found to be in the acceptable range as specified in the test protocol. Ranges for the water quality measurements are provided in the QA/QC Checklist of Attachment I. No abnormal conditions were observed throughout the duration of the test. Thus, the test implementation was determined to be acceptable and in compliance with EPA method requirements.

3.3.1 Test Acceptability Criteria

3.3.1.1 Reference Toxicant

The reference toxicant used during *E. estuarius* chronic toxicity testing was unionized ammonia. The length of the reference toxicant test was 96 hours. All reference toxicant testing was within the two standard deviation quality control limit meeting the test acceptability criteria in compliance with EPA method requirements.

3.3.1.2 Negative Control Samples

Negative control samples demonstrated a 99% survival at all sample stations, which is above the 90% mean acceptability survival criteria. As a result, the negative control sample results are considered acceptable at all sampled stations and in compliance with EPA method requirements.

3.4 Reporting

Bioassay results were delivered in an acceptable laboratory report documenting a summary of water quality results, reference toxicity results, test results, statistical calculations and percent mortality. Additional information regarding test setup/test implementation procedures was provided by the laboratory to complete the QA/QC bioassay data validation form. Overall, the reporting component presenting chronic toxicity test results for *E. estuarius* was deemed acceptable.

3.5 Overall Data Usability

Review of laboratory data indicated chronic toxicity testing was performed in accordance with EPA method 600/R-94/025 as documented in Attachment I. Through the bioassay laboratory report and additional clarification from the laboratory, the bioassay test results at all sample stations was deemed acceptable and in compliance with EPA method requirements.

Attachment I

Dominguez Channel Estuary

Sediment Bioassay Data Validation Form

Tesoro Refining & Marketing LLC
Los Angeles Refinery - Carson Operations
Dominguez Channel Estuary Chronic Toxicity QA/QC Bioassay Data Validation

PROJECT INFORMATION			
Project Name:	Dominguez Channel Sediment Sampling		
Analytical Laboratory:	Aquatic Bioassays & Consulting Laboratories Inc.		
Laboratory Technician:	Joe Freas		
Sample Collection Date:	October 8, 2020		
Sample Locations/Lab Number:	SED-003 / WGR1020.043 SED-004 / WGR1020.044 SED-005 / WGR1020.045 SED-006 / WGR1020.046 SED-007 / WGR1020.047		
Species/Test Method Referenced:	Eohaustorius estuarius EPA/600/R-94-025	**Test Duration:**	SED-003: October 16, 2020 @ 13: 01 - October 26, 2020 @13:01 (10 day) SED-004: October 16, 2020 @ 13: 02 - October 26, 2020 @13:02 (10 day) SED-005: October 16, 2020 @ 13: 03 - October 26, 2020 @13:03 (10 day) SED-006: October 16, 2020 @ 13: 04 - October 26, 2020 @13:04 (10 day) SED-007: October 16, 2020 @ 13: 05 - October 26, 2020 @13:05 (10 day)
Sample Matrix:	Sediment		
Type of Species:	Estuarine		
Data Validator:	Ana Horn		
Validation Date:	December 1, 2020		
Signature:	Ana Horn		
Problems Noted:	No problems or deficiencies identified. Chronic toxicity testing was performed in accordance with EPA method guidelines.		

EOHAUSTORIUS ESTUARIUS

Completeness and Holding Conditions:	
Type of Samples Collected: Grab Sediment Samples	Number of Samples Analyzed: 5
Were samples maintained at 4°C and in the dark after collection? Yes	
Did chronic toxicity testing begin within 14 days of sample collection? Yes	
Holding conditions acceptable? Yes	
If holding conditions were not acceptable, explain: N/A	

Tesoro Refining & Marketing LLC Los Angeles Refinery - Carson Operations Dominguez Channel Estuary Chronic Toxicity QA/QC Bioassay Data Validation	
Quality of Test Organism, Collection and Acclimation:	
Who is the supplier of the test organisms?	Northwestern Amphipod in Oregon
Are organisms field collected or cultured?	Field Collected
If field collected:	
Where was the collection location? Oregon	
What was the organism collection date? Organism were collected on October 5, 2020 and received by the laboratory on October 8, 2020.	
What was the water salinity and temperature at the time of collection? Water salinity at the time of collection was 30 ppt. Temperature at the time of collection was 14.8 Degrees Celsius. Acclimation after collection began at 28 ppt. Final acclimation in laboratory was from 28 ppt to 20 ppt at 2 ppt/day.	
Was site sediment collected for holding and acclimation purposes? Yes, 2L of site sediment was collected and used for acclimation.	
Additional Comments: Quality of test organisms, collection, and acclimation is deemed acceptable.	
Field Collection Sorting Methods	
Were healthy amphipods placed into 10 cm diameter finger bowls with 2 cm sieved site sediment and seawater of appropriate salinity? Yes, only healthy organisms were used for bioassay testing. Health is verified visually on a light table.	
Were organisms held for 2-10 days? Yes, organisms were acclimated for 8 days.	
Was test sediment sieved through 2 mm sieve or forceps for predator removal? Yes, all sediment was sieved using a stainless steel 2mm sieve.	
Was control sediment sieved twice through 0.5 mm? Yes	
Did control sediment have a 4-hour settling period after each sieving? Yes	
Test Initiation	
Was salinity adjusted in all testing chambers? Yes	
Was overlying ammonia detected? No overlying ammonia was detected during testing.	
Were there at least 5 replicates per sample? Yes	
Was there at least 20 animals per replicate? Yes	
Was the organism length between 3-5 mm during test initiation? Yes, organism size was determined using a light table and calipers.	
Was the overlying water volume 800 mL? Yes	
Were there any water quality adjustments? Yes, water quality measurements were collected during the duration of the test and are provided in the corresponding laboratory report.	
Test Implementation	
Photoperiod for 24 hours? Yes, 24 hour light cycle was employed for testing.	
Was daily water quality monitoring conducted? Yes	
What was the overlying daily temperature range (15°C)? The overlying daily temperature was between 14.8-14.9°C.	

Tesoro Refining & Marketing LLC Los Angeles Refinery - Carson Operations Dominguez Channel Estuary Chronic Toxicity QA/QC Bioassay Data Validation	
Was the daily salinity range 20+/-1 ppt? Yes, salinity range was 20ppt.	
Was water renewal conducted? No, water remained static and was not renewed over the 10-day exposure period as required in the EPA method.	
Was the overlying daily pH between 7 – 8 standard units? Yes	
What was the overlying ammonia detection (ND)? No ammonia was detected during testing.	
Were appropriate test chambers used (1-liter glass containers with 10 cm diameter)? Yes	
Was water in each test chamber aerated overnight before start and throughout the test? Yes, 24-hour aeration was performed.	
Did the water maintain at least more than 90% saturation of dissolved oxygen concentration? Yes	
Test Results and Analysis	
Were the number of amphipods reported for each replicate? Yes	
Was the percent mortality reported for each replicate? Yes	
Was the sample mean for survival reported? Yes, the mean control survival was 99-100%	
QA/QC Samples	
Positive Control	*Negative Control*
Length of reference toxicity test? 96 hours	Negative control response above 90% acceptability criteria? Yes
What reference toxicant was used? Unionized Ammonia	Mean control survival? 99%
Exposure concentrations? Exposure ammonia concentrations were 0, 15.6, 31.2, 62.5, 125.0, 250 mg/L	Did EC 50 fall within lab standards? Yes
Did EC 50 fall within lab standards? Yes	