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NPDES DISCHARGE 002

2018
HYDROGRAPHIC SURVEY
AND
INTAKE APPROACH VELOCITY
MONITORING

NPDES PERMIT # CA0006254
CCRWQCB Order No. R3-2000-0041
Dynergy Moss Landing, LLC
Moss Landing Power Plant

Dynegy Moss Landing, LLC

2018 NPDES Hydrographic Survey and Intake Approach Velocity Monitoring



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1.0 Introduction

The Moss Landing Power Plant (MLPP) is a two-unit fossil fueled electrical generating facility located on the shoreline of Monterey Bay approximately midway between Santa Cruz and Monterey, California and about 12 miles northwest of the city of Salinas. The power plant's two units (Units 1 & 2) each have a generating capacity of 510 MW and began commercial operation in 2002. Total generating capacity of the facility is 1,020 MW. Two other units (Units 6 & 7) were originally constructed in the 1960s and were operated through 2016 but have now been permanently shut down.

Cooling water for the facility is drawn from Moss Landing Harbor, which lies immediately west of the plant and opens into Monterey Bay. The plant originally utilized two intake structures; one serving Units 1 & 2, with a maximum flow volume of 250,000 gallons per minute (gpm) and a second which supplied cooling water to Units 6 & 7 but is now no longer in service. Cooling water for Units 1 & 2 is discharged through a pair of common conduits, which run parallel to each other to a point approximately 600 ft offshore, in Monterey Bay. Discharge of the cooling water is regulated under the National Pollutant Discharge Elimination System (NPDES).

The plant operators, Dynegy Moss Landing, LLC, are required under the terms of their NPDES permit (CA0006254) Monitoring and Reporting Program – Order 00-41 issued by the California Water Quality Control Board, Central Coast Region for the Moss Landing Power Plant, to annually report the results of a hydrographic survey of the harbor bottom immediately surrounding the operating intake structure, and bar rack approach water velocity measurements taken in front of the intake. The purpose of these measurements is to provide information about possible shoaling and its effects on the hydrodynamics of the intake structures. The power plant uses this information to monitor the performance of the intake to determine if dredging is necessary to assure the intake operates as close as possible to the original design-basis velocities.

This report presents the results of the 2018 intake area hydrographic survey conducted on June 21, 2018, and the bar rack approach velocity measurements taken at the Moss Landing Power Plant Unit 1 & 2 intake on August 8, 2018. Field survey methods, plant operating conditions and field conditions are also noted within the report.



2.0 Study Methods

2.1 Hydrographic Survey

A hydrographic survey was conducted in Moss Landing Harbor on June 21, 2018 between 9:54 to 12:00 PST, which encompassed the area adjacent to the Moss Landing Power Plant Units 1 & 2 intake structures. The area in front of the Units 1 & 2 intake included the entire 80 ft width of the intake structure and adjacent areas, 180 ft to the south, 180 ft to the north and 240 ft to the west, offshore. Conditions at the time of the survey were relatively calm inside Moss Landing Harbor with little swell, a gentle breeze, and clear skies. Based on tidal predictions (Nobeltec's Tides & Currents Pro), the survey was conducted around the day's 0.67 ft MLLW low tide that occurred at 10:59 PST. Mean tide during the survey was 0.75 ft MLLW, with maximum and minimum tide heights of 0.90 ft and 0.67 ft MLLW (**Figure 2-1**).

A conductivity, temperature and depth (CTD) cast made at the middle of the survey was used to estimate the sound speed in water that the echosounder requires for converting time of arrival to depth. The YSI Castaway CTD measured an average temperature of 16.4 °C, a salinity of 33.7 practical salinity scale (PSS) and a sound speed of 1509 m/s (**Figure 2-2**).

Moving map navigation software running on a Lenovo E550 ThinkPad laptop computer connected to a Leica model MNA1200 antenna and interfaced with a NovAtel Propak V3 receiver global positioning system (DGPS) was used for piloting an outboard powered 13 ft boat along a predetermined set of tracks perpendicular to the shore with 16 ft (5 m) spacing. A second set of tracks was made at right angles, i.e. parallel to shore, also with 16 ft (5 m) spacing for quality assurance and correcting any time lags between soundings and positions (**Figure 2-3**). Depth measurements were made at a rate of 5 per second (5 Hz) with a BioSonics DTX digital echosounder and 201 kHz 6.7-degree (full beamwidth at half power) transducer submerged about 1.1 ft and connected to a Lenovo E550 ThinkPad laptop computer. Laptop computer time was synchronized within one second of UTC using the DGPS and computer program, NovAtel Connect. Further refinement of the latency correction was made using an R statistics software program that fit times to depths measured at a number of track crossings. The resolution of depth measurements was approximately 0.7 in (1.8 cm) (44 kHz digitizing sample interval). Water column measurements made at a 5 Hz rate including bottom reflections and UTC times were recorded on the computer for later processing of bottom depths and latency correction.

Vertical and horizontal positions of the transducer were recorded at a 5 Hz rate using a Leica model MNA1200 antenna mounted 6.93 ft (2.11 m) vertically and directly above the transducer's face and interfaced with a NovAtel Propak V3 receiver. NovAtel Connect software was used to collect the receiver's data with a Lenovo ThinkPad E550 laptop. NovAtel's Waypoint GrafNav post-processing software was used for estimating survey quality horizontal and vertical positions in the NAD 83 and NAVD 88 reference frames using a nearby GPS Continuously Operating Reference Station (CORS) (Station P210 in Watsonville, CA [UNAVCO/PBO]).



Digital bottom depths from the echosounder data were post-processed using BioSonics Visual Analyzer software for outputting depth and time in ASCII format. An R statistical software script was used to convert the Biosonics ASCII output to a 5 Hz format usable by ArcGIS, which required the use of time in tenths of seconds. A bar-check calibration of the echosounder performed using a 7-inch disk at depths of 10 and 15 ft showed that a depth correction of -1.57 in. (-3.99 cm) was necessary. A latency correction (the difference between the echosounder time and the GPS time) was calculated from the two sets of time tracks (echosounder and GPS) using an automated program written in the R statistics package. The program identified a number of near crossings by adjusting time to minimize the depth differences at these points. The soundings and the horizontal and vertical positions were merged using a program written in the R statistics package and imported into ArcGIS to create a bathymetric surface. All depth data were referenced to MLLW by using a correction from NAVD 88 elevations. This correction was derived from the Vertical Datum Transformation Software (V-Datum ver. 3.3) provided by NOAA National Ocean Service. The NAVD 88 0 Datum is, on average, 0.1471 ft below the MLLW 0 Datum.

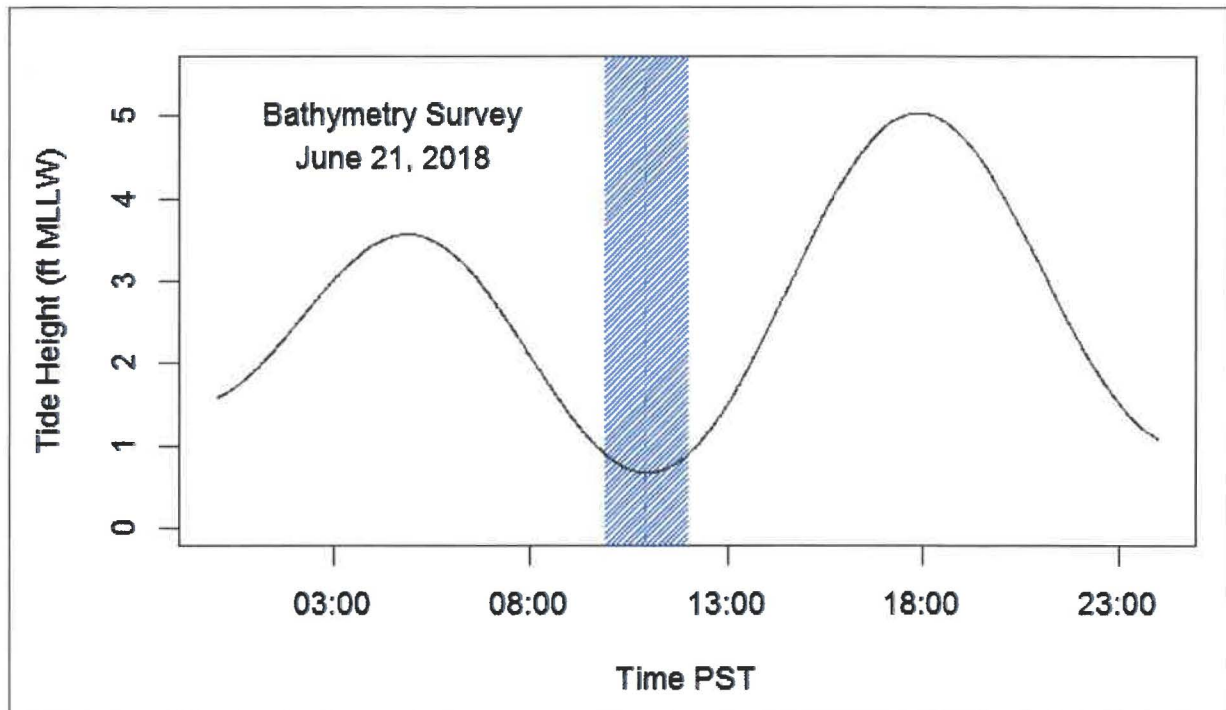


Figure 2-1. Tidal height predictions for Elkhorn Slough, Highway 1 Bridge on June 21, 2018 (09:54 to 12:00 PST) during a bathymetric survey near Moss Landing Power Plant. Minimum, maximum, and average tides during the survey periods were 0.67, 0.90 and 0.75 ft MLLW.

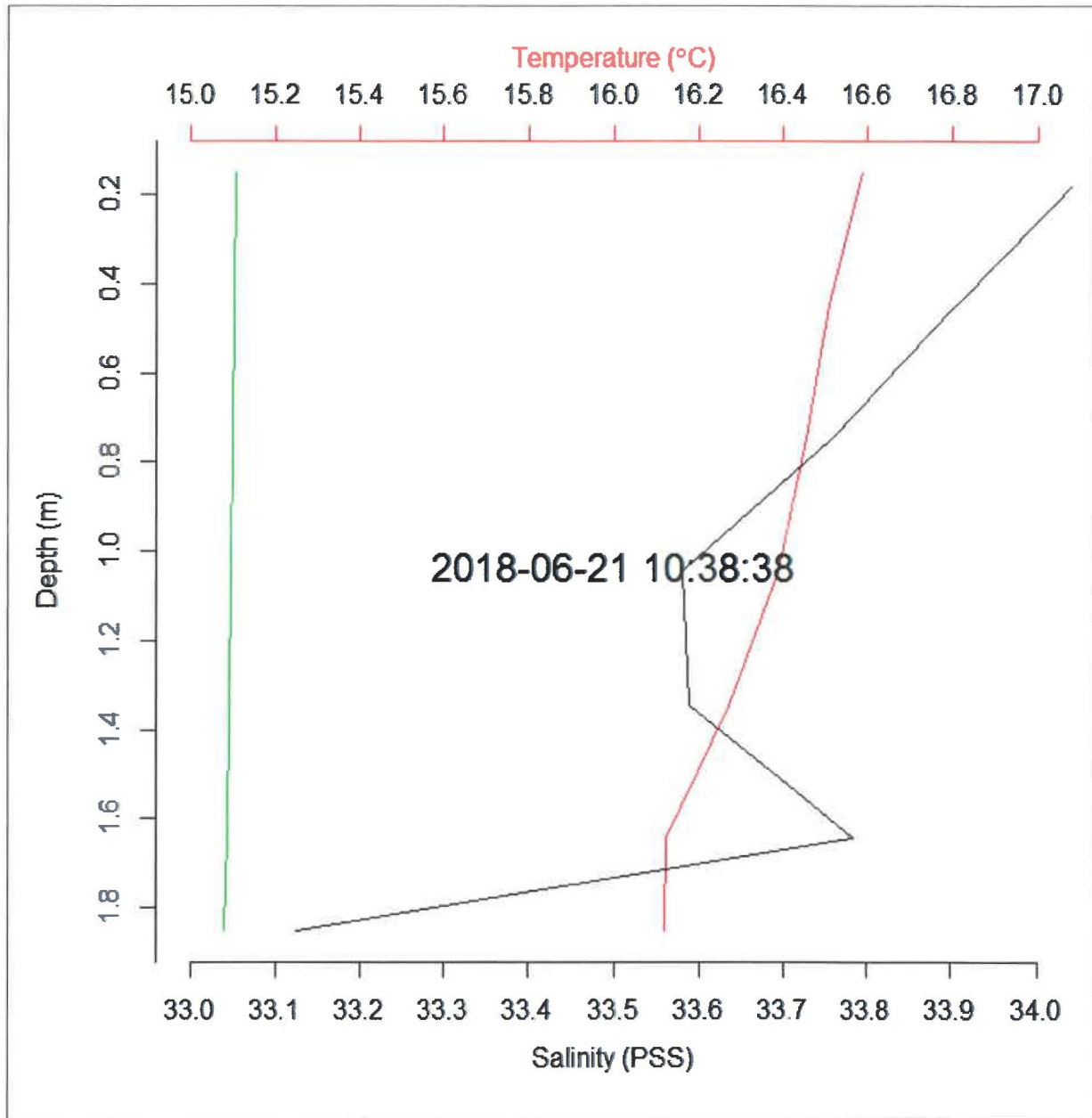


Figure 2-2. Temperature (°C) and salinity (Practical Salinity Scale) profiles on June 21, 2018 in Moss Landing Harbor directly in front of the power plant. Vertical scale is depth in meters. Green line represents the profile estimate of sound speed (temperature scale X 100 in meters per second).

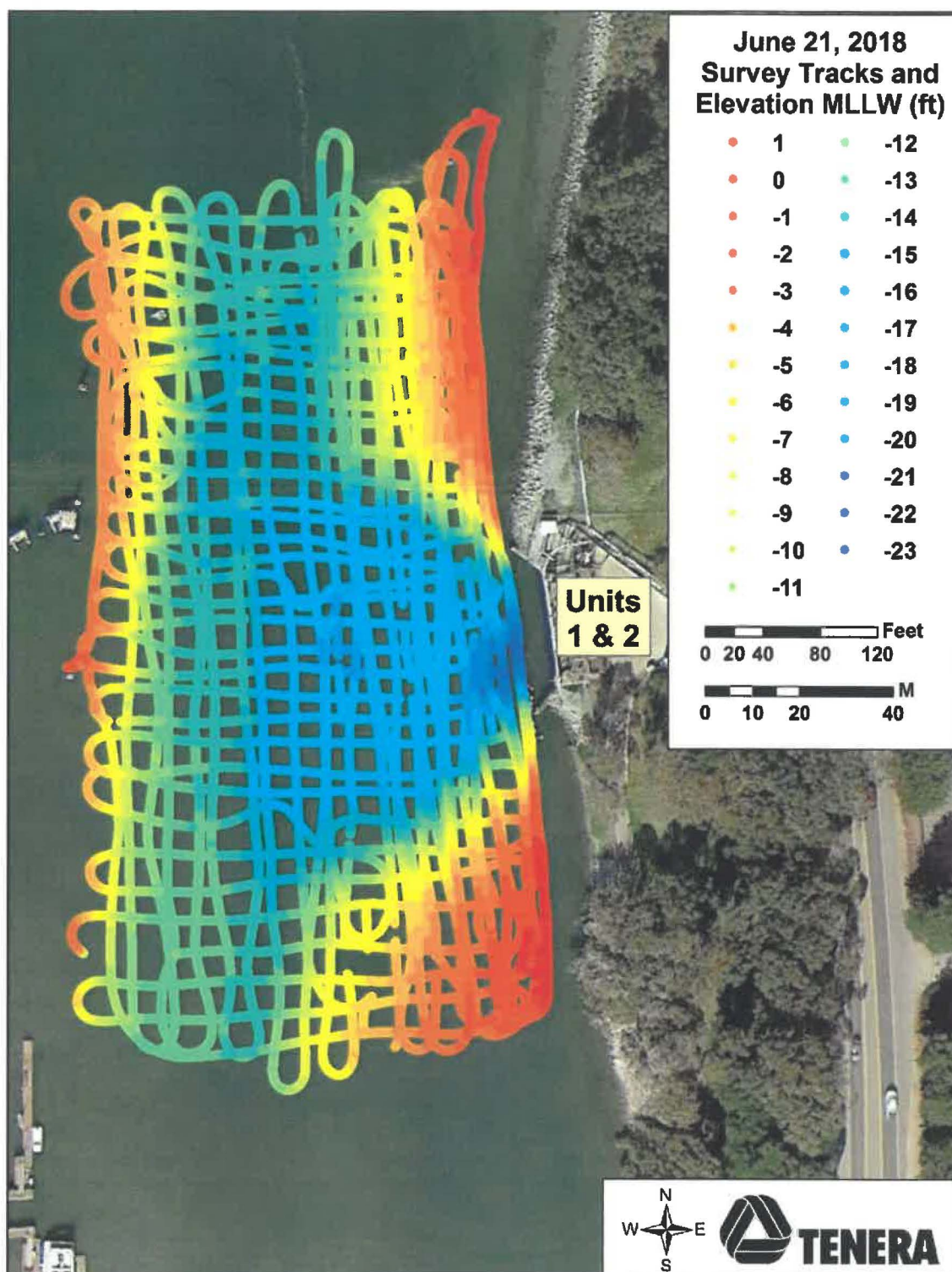


Figure 2-3. Hydrographic survey track at the Moss Landing Power Plant intake area. The figure shows the boat's track and bottom elevation (MLLW) while performing the hydrographic survey in front of Units 1 & 2 on June 21, 2018.

2.2 Intake Approach Velocity Measurement

Intake approach velocity measurements at the Units 1 & 2 intake are usually conducted during neap tide periods (half-moon phases) when the amplitude of the tidal fluctuations (differences between high and low tide heights) is reduced in comparison with spring tides (full moon or new moon phases). This year the survey was conducted one day after the half-moon phase. The approach velocity measurements in front of the Units 1 & 2 intake structure were made on August 8, 2018 between 09:41 and 13:48 PST. Velocities at the Units 1 & 2 intake were measured prior to the day's 13:13 PST 2.2 ft MLLW higher low water, starting from 3.5 ft above MLLW and ending at 2.3 ft MLLW (**Figure 2-4**). Tidal heights were estimated from predictions for Moss Landing Harbor at the Highway 1 Bridge at Elkhorn Slough using Nobeltec's Tides & Currents software.

All six of the Unit 1 & 2 circulating water pumps (CWPs) (nominal flow of 250,000 gpm) were operating during the survey of the intake structure. The Unit 1 & 2 bar racks were cleaned of debris just prior to the August 8, 2018 survey.

The Units 1 & 2 CWPs are not located at the intake structure but are positioned approximately 350 ft east of the intake and are connected to the intake by a pair of conduits that extend under California Highway 1. The traveling water screens (TWS), used for removing debris from the cooling water prior to its arrival at the CWPs, are located at the intake and, as a result, the intake structure is divided into six bays to accommodate this equipment. All six TWS were in operation during this survey. A single large bar rack lies in front of and extends across the entire width of the intake structure.

The Units 1 & 2 intake structure curtain wall originally extended to a depth of 8.0 ft MLLW but was modified during modernization of the plant and now extends below the waterline to a depth of about 1.0 ft MLLW. The bottom of the intake bay opening is at approximately -20.4 ft MLLW. The original design-basis estimate of approach velocity at the bar rack is 0.5 fps.

Intake velocities at the Units 1 & 2 intake structure were measured at the MLPP on August 8, 2018. At each TWS, data was taken at five depth levels for 180 seconds at 32 Hz using a Nortek Vector current meter resulting in 5,760 samples. Data was screened by removing extreme values (spikes) using a median ($n=31$) and standard deviation (3 times) filter (Analysis of Oceanographic Data, Version 0.9-23, <https://cran.r-project.org/web/packages/oce/oce.pdf>) as well as rejecting samples that had any beam correlations less than 80%.

The Nortek Vector is a 6 MHz Acoustic Doppler Velocimeter (ADV). This instrument replaced the 2 MHz Nortek Acoustic Doppler Current Profiler (ADCP) used in previous studies due to its ability to focus on each position 1.125 ft (0.343 m) from the face of the bar rack. Each intake profile was measured by lowering the ADV to the bottom of the intakes' bar rack on a 2 ft wide x 5 ft long sled, and then raising it in 4 ft increments. The ADV boresight was oriented downward and parallel to the intakes' bar rack (**Figure 2-5**). The outward tilt from vertical



(pitch) side angle (roll) was recorded and the depth was controlled with ropes attached to the sled. The ADV was lowered and recorded 180-second sets of velocities over five different elevations that ranged from -0.5 to -15.9 ft MLLW. Water velocity measurement locations were referenced to intake deck elevation and the unit being measured. The deck elevation at Units 1 & 2 was 9.6 ft MLLW with orientation of 354 degrees.

At Units 1 & 2, the ADV (**Figure 2-6**) was lowered on an approximately 14.5-degree slope from vertical of the bar racks and thus pointed 14.5 degrees down from vertical and parallel to the bar. This angle varied from 14.24 to 14.75 degrees (average 14.5 degrees) at the various survey points due to interference of the bars with sled runners and debris. During this year's survey of the Units 1 & 2 bar racks, floating mats of algae (*Enteromorpha*) and non-buoyant algal debris on the submerged portions of the bar racks were sparse in comparison with previous surveys (e.g. 2016) when impinged debris was quite heavy.

Currents were measured in a 0.586 in (0.0149 m) long volume of water in three vector directions: x'' , y'' and z'' . The instrument's x'' -axis was oriented outward averaging 14.5 degrees up from horizontal, therefore with the z'' -axis pointed 14.5 degrees up from vertical toward the structure at Units 1 & 2. This orientation required rotations using tilt and roll angles measured by the inclinometer in post-processing to produce x , y and z current vectors that are perpendicular and parallel to the intake structure. The transformation of the coordinates is shown in **Figure 2-7**.

Salinity and temperature were measured at the beginning, middle and end of the survey using a YSI Castaway conductivity, temperature, and depth (CTD) profiling meter. Salinity and temperature were used to calculate sound speed that is used in the Nortek ADV data collection software in order to estimate range and speed. The average temperatures and salinities varied very slightly from the beginning until the end of the survey (**Figures 2-8**). The average profile temperature (14.07°C) and salinity (32.69) was used to estimate sound speed of 1501 m/s.



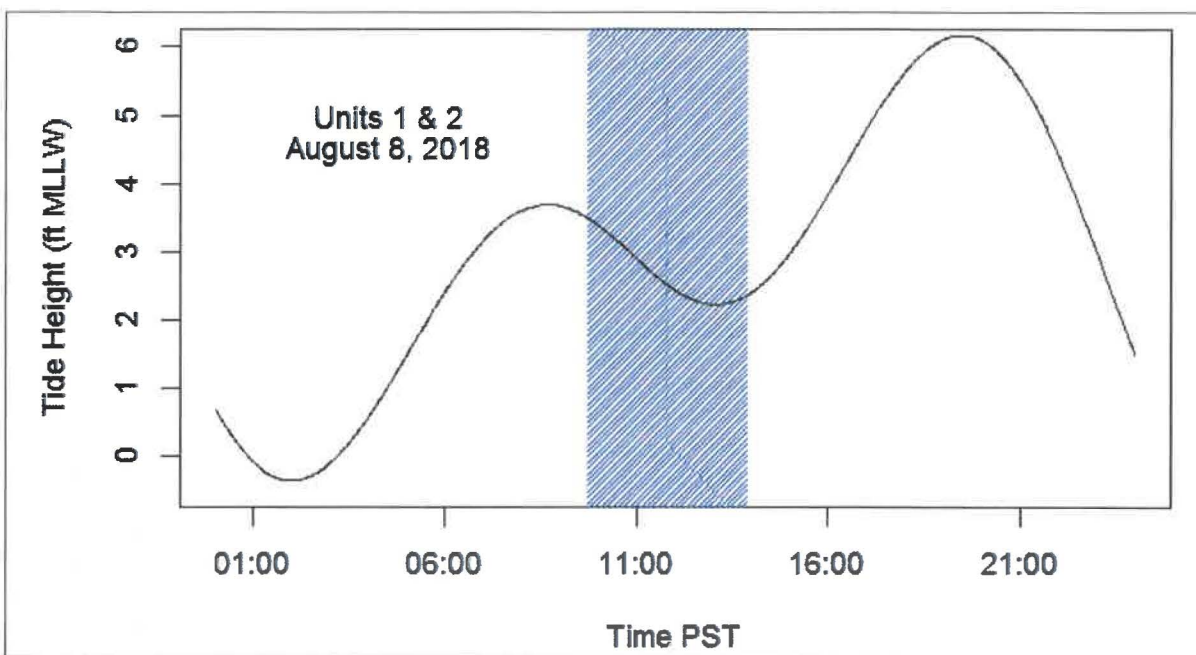


Figure 2-4. Tidal height predictions for Elkhorn Slough, Highway 1 Bridge on August 8, 2018. Shaded times (Units 1 & 2, 9:41 to 13:48 PST) correspond to measurements of bar rack approach velocities at Units 1 & 2 intake structures of the Moss Landing Power Plant. Minimum, maximum, and average tides during the survey periods were 2.23, 3.49 and 2.66 ft MLLW at Units 1 & 2.



Figure 2-5. Nortek Vector Acoustic Doppler Velocimeter (ADV) mounted on a sled in a horizontal pointing direction prior to measure intake approach velocities at the Moss Landing Power Plant Units 1 & 2 intakes.



Figure 2-6. Deployment of the Nortek Acoustic Velocimeter (ADV) at Units 1 & 2 intake structure during the 2018 approach velocity measurement survey.

The z'' - x'' plane was rotated $\alpha = 14.5^\circ$ about y' :

$$x' = z'' \sin \alpha + x'' \cos \alpha$$

$$z' = z'' \cos \alpha - x'' \sin \alpha$$

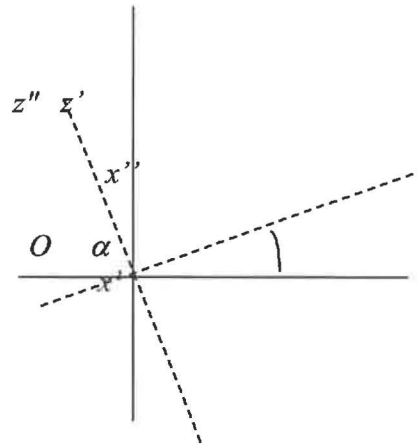


Figure 2-7. At Units 1 & 2, transformation of coordinates involved a rotation for analysis and visualization. The ADV x'' -axis was positioned outward from the intake bar racks and the z'' -axis about 14.5° from vertical at the Moss Landing Power Plant, Units 1 & 2 intake. The drawing above illustrates the rotation about the ADV y' -axis, with z'' -axis angled upward. In the final coordinates: $x=y''$; $y=-x'$, $z=z'$.

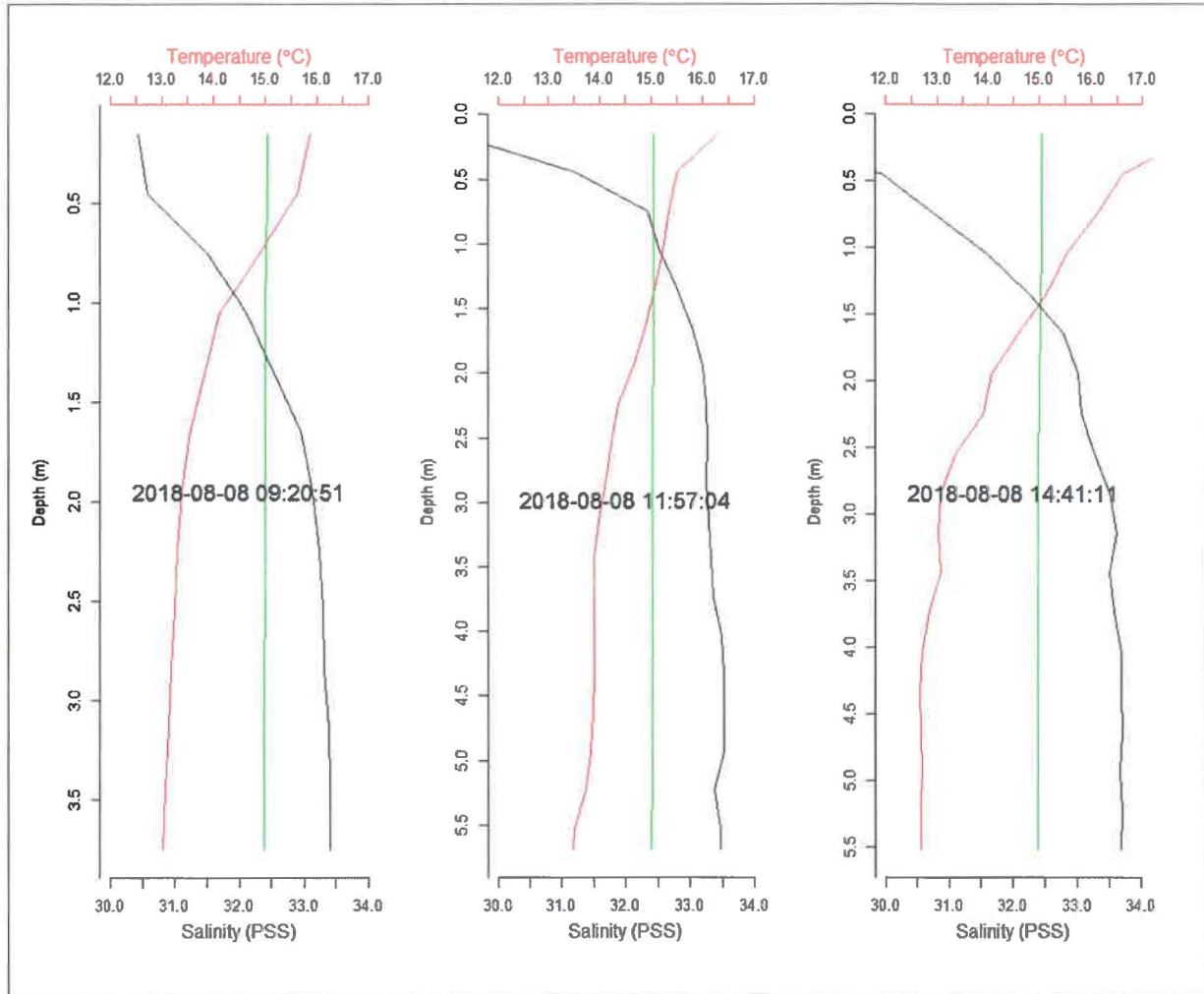


Figure 2-8. Temperature (°C) and salinity (Practical Salinity Scale) profiles on August 8, 2018 at the Moss Landing Power Plant Units 1&2. Vertical scale is depth in meters. Green line represents the profile estimate of sound speed (temperature scale X 100 in meters per second).

3.0 Results

3.1 Hydrographic Survey

The elevations recorded during the June 21, 2018 hydrographic survey are shown in **Figure 3-1**. **Figure 3-1** presents the water depths directly in front of the Units 1 & 2 intake bays and out 225 ft due west, as far as the east edge of the harbor inner channel. In the zone of interest, directly in front and up to 180 ft from the intake structure, elevations ranged between -12.2 ft (at the north shore) and -21.3 ft (directly in front) MLLW with an average of -17.5 ft MLLW and standard deviation of 1.2 ft. Shallower elevations were found nearshore to the north and south of the intake structure. The deepest area in this zone was found 18 ft directly in front of Unit 2. Another deep area of -18.0 ft was found approximately 139 ft offshore in front of Unit 1.

Elevations in the overall survey area ranged from -1.5 ft to -21.3 ft MLLW with an average elevation of -12.7 ft MLLW and standard deviation of 5.1 ft. As in previous surveys from 2010 through 2017, a relatively flat area about -18.0 ft MLLW was found approximately 120 to 150 ft offshore the Unit 2 intake bays. This area was found to be 0.3 ft shallower than in 2017. The harbor navigation channel elevations measured approximately -14.4 ft MLLW, 0.3 feet shallower than in 2017.

Overall, the bottom elevations west of the Units 1 & 2 intakes in 2018 showed a rise in elevation compared to 2017 with an average elevation change of 0.17 ft shallower.

Table 3-1 presents the elevations near each intake structure at the Unit Bay centerlines, approximately 26 ft from Units 1 & 2. **Figure 3-2** shows profiles at those distances superimposed in front of Unit 1 & 2. Directly in front of the intake structure the 2018 profiles are very similar to those measured in past years.

Depths across the Units 1 & 2 intake approach (**Figure 3-2**), averaged 0.06 shallower than a year earlier. Offshore of Units 1 & 2, along three transects perpendicular to shore, depths averaged 0.22, 0.11 and 0.22 ft shallower from north to south than in 2017 (**Figure 3-3**). **Table 3-1** indicates that the average depths offshore Units 1 & 2 have become appreciably shallower over the time period from 2011. Although there was an average rise in the entire survey elevations from 2017, the elevations 26 ft offshore of the intake are deeper at Unit 1 (-0.25 ft), and unchanged at Unit 2 (0.01 ft shallower).



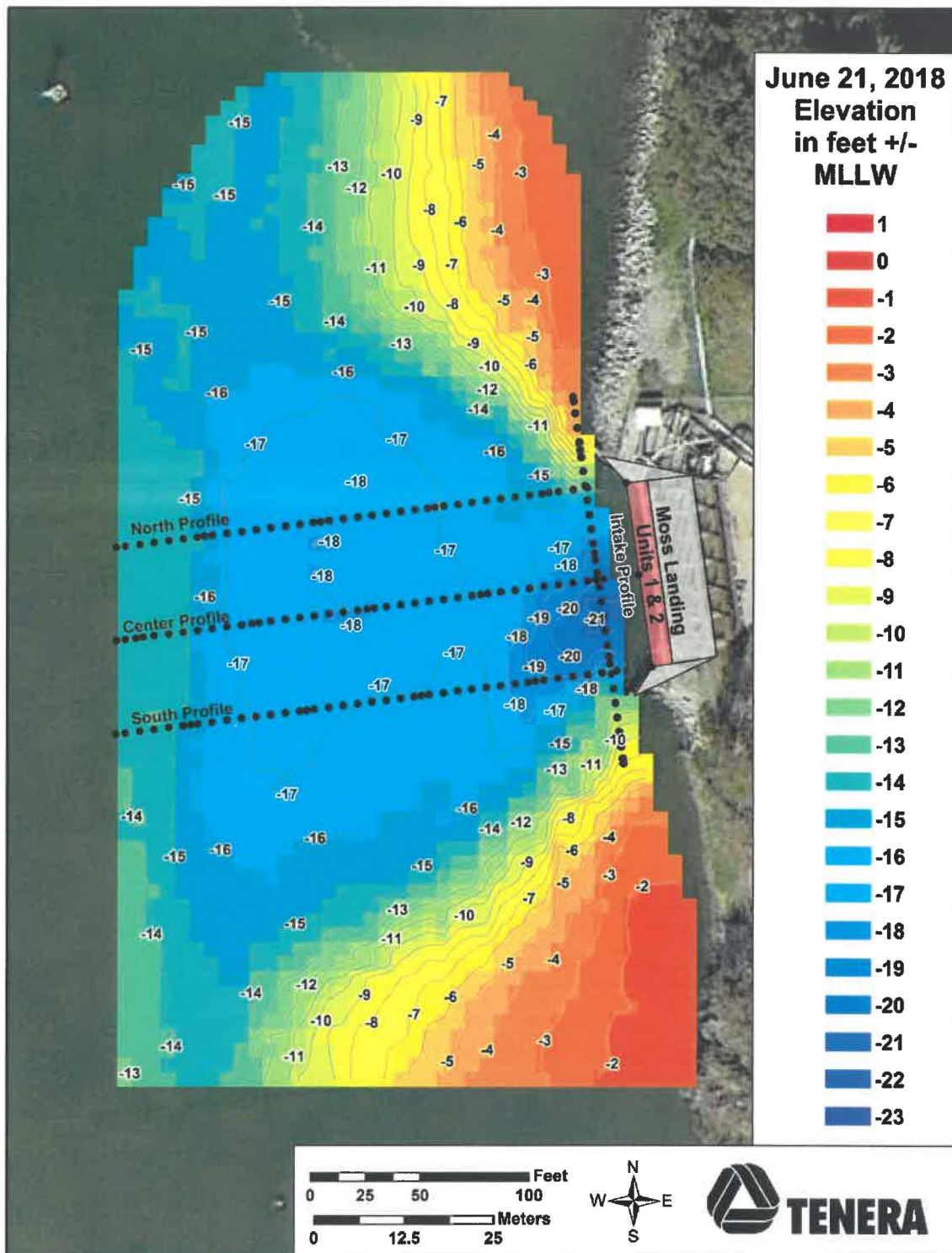


Figure 3-1. Bottom elevations near the Moss Landing Power Plant Units 1 & 2, June 21, 2018, in feet relative to mean lower low water (MLLW).

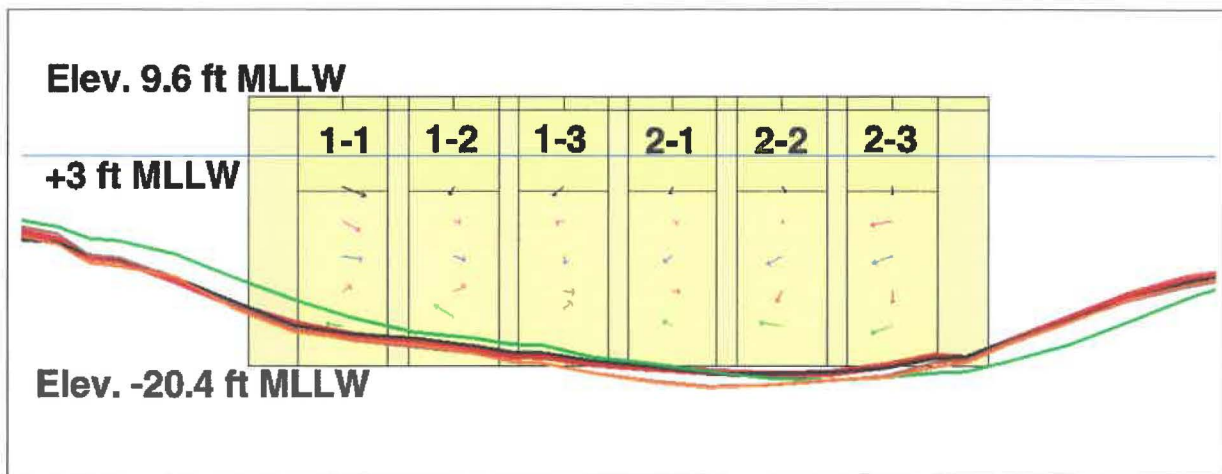


Figure 3-2. Bottom elevations in feet at Units 1 & 2 of the Moss Landing Power Plant intake structure. Profile (solid red) was made approximately 26 ft offshore of the intake structure, from a hydrographic survey June 21, 2018. (2014 orange, 2015 brown, 2016 green, 2017 black, 2018 red). View is facing the intake structure from Moss Landing Harbor.

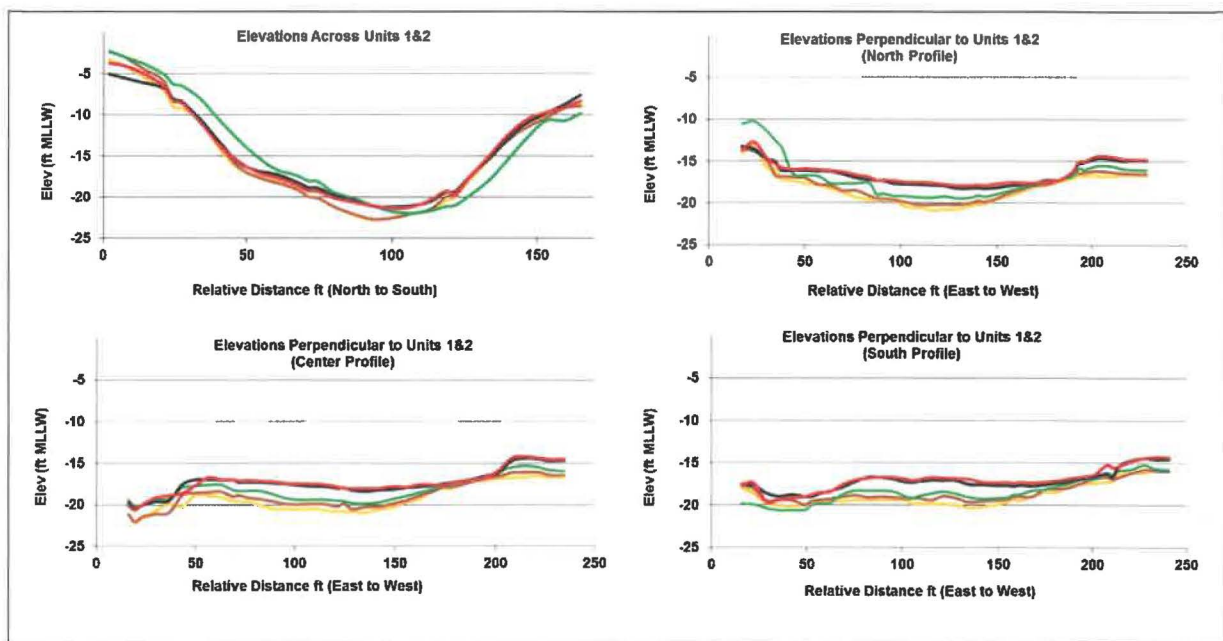


Figure 3-3. Bottom elevations of selected transects near Units 1 & 2 (2014 orange, 2015 brown, 2016 green, 2017 black, 2018 red).

Table 3-1. Elevations (ft MLLW) at the intake approach of Units 1 & 2 interpolated from a topographic surface across the intake bay offshore from the intake structure including elevations surveyed June 21, 2018. Elevations are reported from current and previous studies (2011-2018).

Unit 1 & 2 Intake Bay Bathymetry 26 ft Out	1-1	1-2	1-3	2-1	2-2	2-3
2018	-16.7	-18.1	-19.6	-20.7	-21.3	-20.2
2017	-16.6	-17.8	-19.3	-20.7	-21.2	-20.4
2016	-14.7	-17.1	-18.6	-20.4	-21.8	-21.6
2015	-17.3	-18.7	-20.5	-22.2	-22.4	-21.3
2014	-17.3	-18.6	-20.5	-22.4	-22.4	-21.5
2013	-16.7	-18.7	-20.3	-21.9	-21.9	-21.2
2012	-17.4	-19.1	-20.7	-22.4	-22.6	-20.5
2011	-17.7	-19.3	-21.2	-22.6	-22.6	-21.4

3.2 Intake Approach Velocity Measurement

At Units 1 & 2, the Nortek ADV collected 5,760 samples over a three-minute period at 30 locations. Measurement precision was high; the average of the standard deviations of speed estimated at the 30 locations was 0.0829 fps with a range from 0.0428 to 0.0914 fps.

The engineered design velocity for the Units 1 & 2 intake structure with all six CWP's operating is 0.5 fps. During the study, the average intake approach velocity was 0.484 fps. The individual average speeds varied from 0.300 to 0.631 fps with an average standard deviation of 0.0622 fps computed with the 30 locations' standard deviations (**Table 3-2**). Unlike 2016 and 2017, the intake structure approach speeds were slightly higher at the Unit 1 intake bays. However as in the 2016 and 2017 findings, the Unit 1 intake bay 3 had the highest average speed and was estimated at 0.567 fps; the 2017 speed was 0.617 fps. The lowest intake bay speed was 0.300 fps at Unit 2 intake bay 2, closest to surface. Average speeds across the three intake bays at the north end of the intake structure (Unit 1) were 0.509 fps and only somewhat slower than the three southern intake bays' (Unit 2) average, 0.460 fps. These speeds are like those measured in 2017 of 0.492 and 0.531 fps and in 2016 of 0.450 and 0.462 fps but higher than those measured in 2015 of 0.373 and 0.384 fps. This year's overall estimated speed of 0.484 fps was less than that estimated in 2017 of 0.512 fps but greater than the 2016 speed of 0.456 fps, the 2015 speed of 0.378 fps, the 2014 speed of 0.436 fps, the speed of 0.481 fps measured in 2013 and the 2012 speed of 0.442 fps.

Figure 3-4 shows the side view of the velocity vectors at Units 1 & 2. **Figure 3-5** shows the plan view of the velocity vectors for each bay at Units 1 & 2. **Figure 3-6** depicts a three-dimensional representation of the intake structure with the velocity vectors.



Table 3-2. Intake structure approach velocities (V), Units 1 & 2 of the Moss Landing Power Plant, August 8, 2018 (09:41 to 13:48 PST). Vx is positive in the x direction along the intake structure face (~172° T). Vy is positive toward the intakes in the y direction (~82° T). Vz is positive up. Average speed is shown for individual intake bays, for each Unit, and the entire intake structure.

Unit -Bay	Elev (ft MLLW)	Vx (fps)	Vy (fps)	Vz (fps)	Speed (fps)	St. Dev. Speed (fps)	N	Bay (fps)	Unit (fps)	Group (fps)
1-1	-0.454	0.254	0.238	-0.103	0.373	0.070	5128	0.472	0.509	0.484
	-4.327	0.189	0.407	-0.102	0.471	0.077	5124			
	-8.199	0.218	0.438	-0.033	0.500	0.072	5097			
	-12.072	0.087	0.507	0.056	0.529	0.079	5136			
	-15.944	-0.179	0.445	0.029	0.489	0.067	5052			
1-2	-0.454	-0.050	0.344	-0.088	0.369	0.059	5073	0.486		
	-4.327	0.062	0.518	-0.010	0.529	0.050	5127			
	-8.199	0.115	0.543	-0.040	0.561	0.075	5170			
	-12.072	0.115	0.568	0.059	0.587	0.067	5204			
	-14.976	-0.219	0.262	0.140	0.388	0.083	5081			
1-3	-0.454	-0.119	0.404	-0.099	0.437	0.043	5292	0.567		
	-4.327	-0.083	0.521	-0.010	0.539	0.058	5108			
	-8.199	0.020	0.597	-0.078	0.607	0.058	5113			
	-12.072	0.118	0.615	-0.013	0.631	0.047	5085			
	-14.008	0.092	0.608	0.067	0.621	0.052	5160			
2-1	-0.454	-0.030	0.354	-0.078	0.374	0.053	5100	0.489	0.460	
	-4.327	0.050	0.453	-0.026	0.466	0.051	5119			
	-8.199	-0.100	0.507	-0.058	0.529	0.053	5119			
	-12.072	0.075	0.532	0.001	0.544	0.051	5110			
	-15.944	-0.103	0.516	0.054	0.533	0.054	5160			
2-2	-0.454	0.043	0.283	-0.059	0.300	0.049	5079	0.447		
	-4.327	0.013	0.448	-0.002	0.460	0.066	5121			
	-8.199	-0.160	0.445	-0.086	0.490	0.057	5174			
	-12.072	-0.059	0.456	-0.114	0.489	0.057	5117			
	-15.944	-0.249	0.422	0.042	0.496	0.047	5112			
2-3	-0.454	-0.005	0.303	-0.092	0.337	0.069	5025	0.445		
	-4.327	-0.255	0.332	-0.038	0.437	0.077	5126			
	-8.199	-0.223	0.417	-0.078	0.501	0.079	5111			
	-12.072	-0.002	0.468	-0.128	0.515	0.091	5105			
	-15.944	-0.241	0.338	-0.079	0.433	0.060	5184			



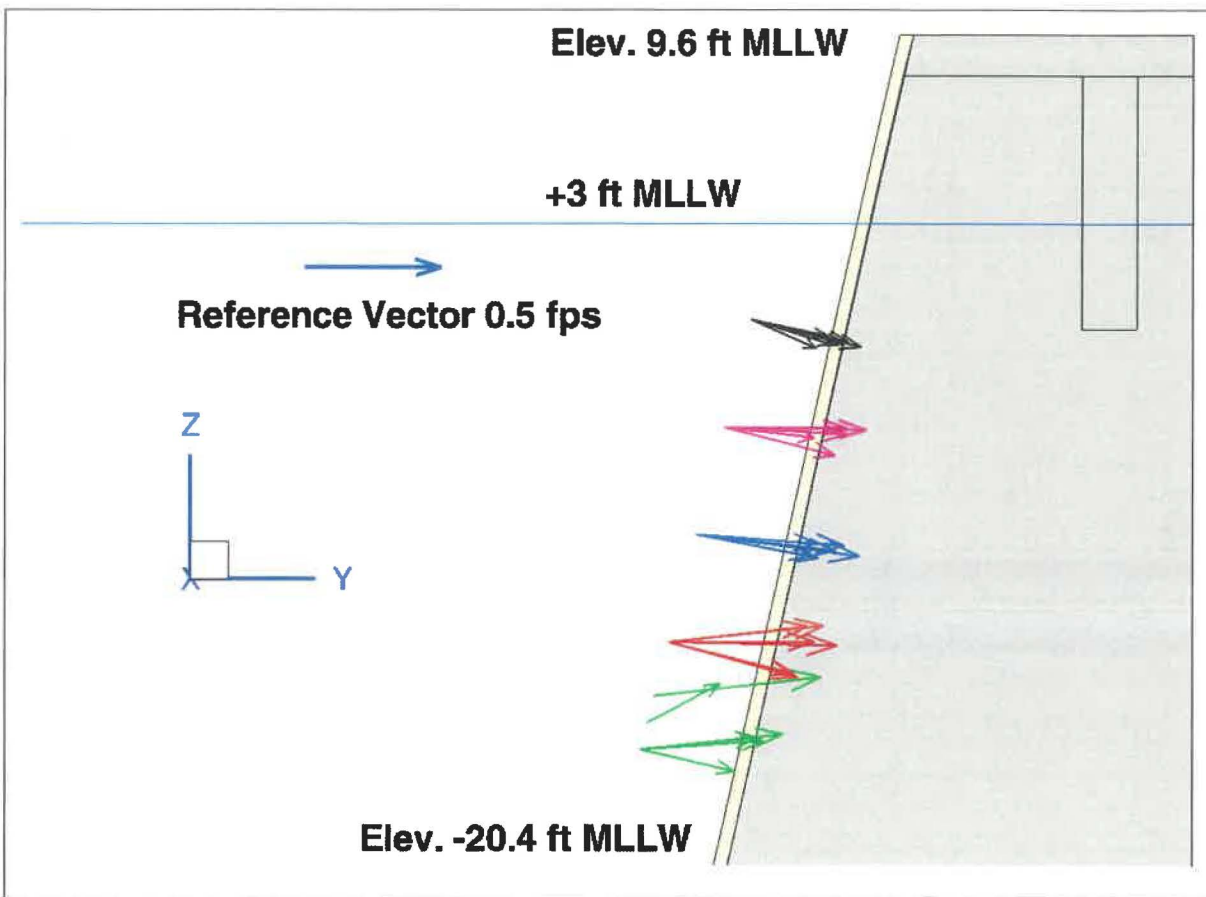


Figure 3-4. Side view of intake approach velocity vectors at the Moss Landing Power Plant, Units 1 & 2, August 8, 2018 (09:41 to 13:48 PST).

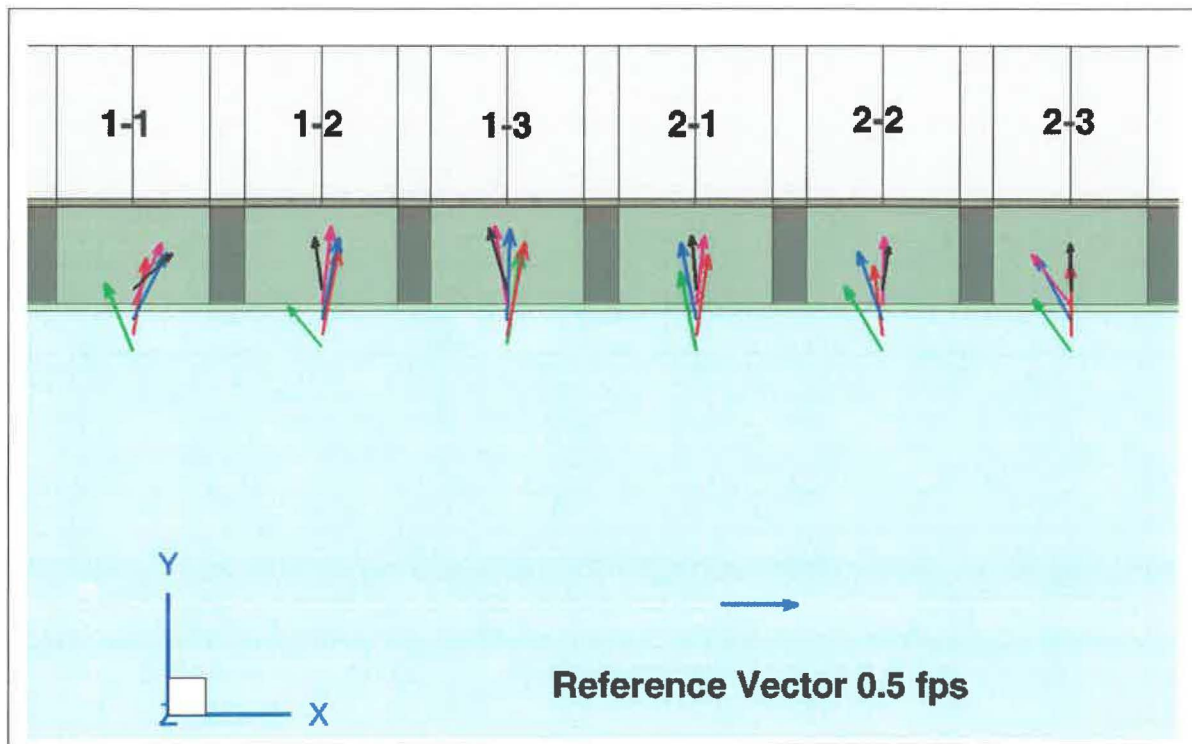


Figure 3-5. Plan view of intake approach velocity vectors at the Moss Landing Power Plant, Units 1 & 2, August 8, 2018 (09:41 to 13:48 PST).

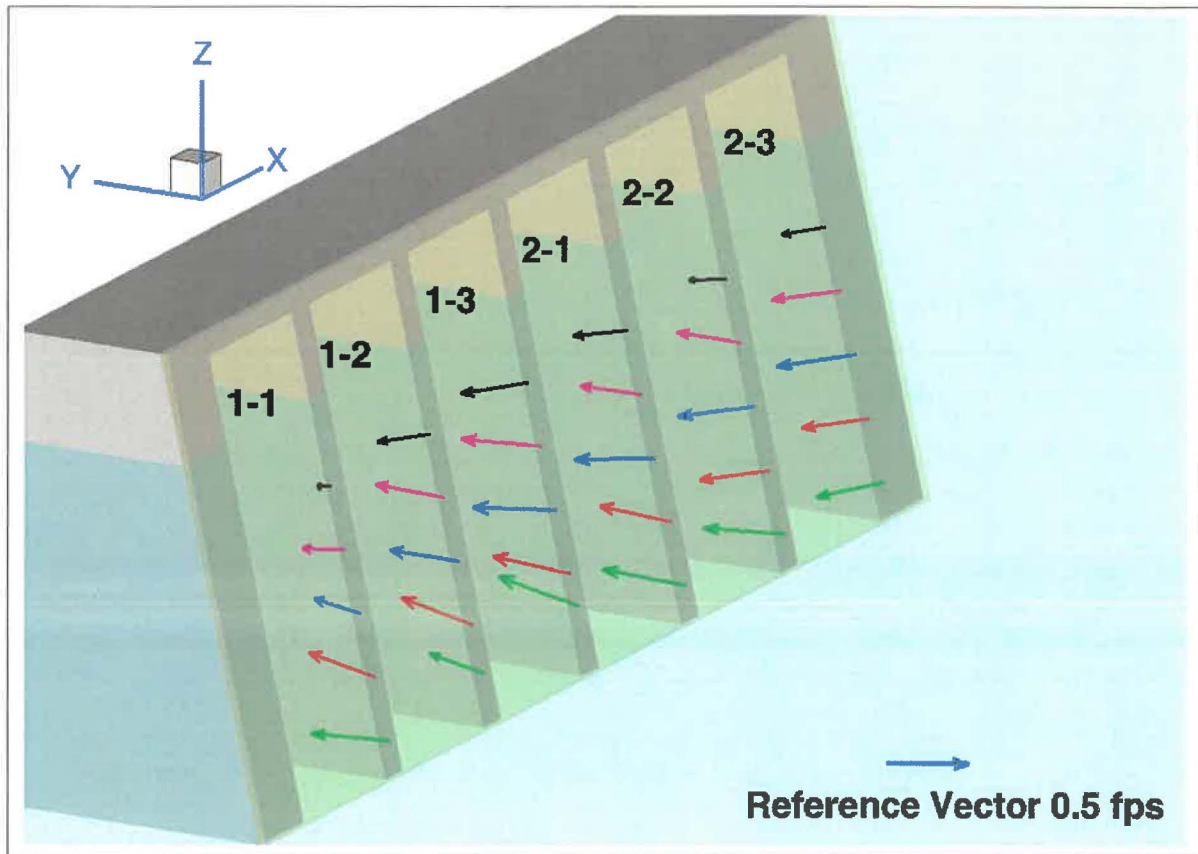


Figure 3-6. Intake approach velocity vectors at Units 1 & 2 of the Moss Landing Power Plant, August 8, 2018 (09:41 to 13:48 PST).

NPDES Annual Report - 2018

**Chemical Analyses
of
Filtered Waste Water through 5 micron
Filters from the Three Surface
Impoundments for Closure Activity of
Flushing Piping Decontamination to the
Impoundments**

NPDES Permit # CA0006254
CCRWQCB Order No. R3-2000-0041
Dynegy Moss Landing, LLC
Moss Landing Power Plant



McC Campbell Analytical, Inc.

"When Quality Counts"

Analytical Report

WorkOrder: 1808177

Report Created for: Fletcher Consultants, Inc.

4858 Harbord Drive
Oakland, CA 94618

Project Contact: Craig R. Fletcher

Project P.O.:

Project: MCWP Closure Project

Project Received: 08/03/2018

Analytical Report reviewed & approved for release on 08/08/2018 by:

Jennifer Lagerbom
Project Manager

The report shall not be reproduced except in full, without the written approval of the laboratory. The analytical results relate only to the items tested. Results reported conform to the most current NELAP standards, where applicable, unless otherwise stated in the case narrative.





Glossary of Terms & Qualifier Definitions

Client: Fletcher Consultants, Inc.
Project: MCWP Closure Project
WorkOrder: 1808177

Glossary Abbreviation

%D	Serial Dilution Percent Difference
95% Interval	95% Confident Interval
DF	Dilution Factor
DI WET	(DISTLC) Waste Extraction Test using DI water
DISS	Dissolved (direct analysis of 0.45 µm filtered and acidified water sample)
DLT	Dilution Test (Serial Dilution)
DUP	Duplicate
EDL	Estimated Detection Limit
ERS	External reference sample. Second source calibration verification.
ITEF	International Toxicity Equivalence Factor
LCS	Laboratory Control Sample
MB	Method Blank
MB % Rec	% Recovery of Surrogate in Method Blank, if applicable
MDL	Method Detection Limit
ML	Minimum Level of Quantitation
MS	Matrix Spike
MSD	Matrix Spike Duplicate
N/A	Not Applicable
ND	Not detected at or above the indicated MDL or RL
NR	Data Not Reported due to matrix interference or insufficient sample amount.
PDS	Post Digestion Spike
PDSD	Post Digestion Spike Duplicate
PF	Prep Factor
RD	Relative Difference
RL	Reporting Limit (The RL is the lowest calibration standard in a multipoint calibration.)
RPD	Relative Percent Deviation
RRT	Relative Retention Time
SPK Val	Spike Value
SPKRef Val	Spike Reference Value
SPLP	Synthetic Precipitation Leachate Procedure
ST	Sorbent Tube
TCLP	Toxicity Characteristic Leachate Procedure
TEQ	Toxicity Equivalents
WET (STLC)	Waste Extraction Test (Soluble Threshold Limit Concentration)



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Glossary of Terms & Qualifier Definitions

Client: Fletcher Consultants, Inc.
Project: MCWP Closure Project
WorkOrder: 1808177

Analytical Qualifiers

a1 Sample diluted due to matrix interference
g3 pH sample volume was reduced due to nature of the sample.



Analytical Report

Client: Fletcher Consultants, Inc.
Date Received: 8/3/18 15:32
Date Prepared: 8/4/18
Project: MCWP Closure Project

WorkOrder: 1808177
Extraction Method: CA Title 22
Analytical Method: SW6020
Unit: mg/L

CAM / CCR 17 Metals (STLC)

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MLS18-136	1808177-001A	Solid	08/02/2018 11:00	ICP-MS3 162SMPL.D	162712

Analytes	Result	RL	DF	Date Analyzed
Antimony	ND	0.10	1	08/07/2018 02:07
Arsenic	ND	0.10	1	08/07/2018 02:07
Barium	1.5	1.0	1	08/07/2018 02:07
Beryllium	ND	0.10	1	08/07/2018 02:07
Cadmium	ND	0.050	1	08/07/2018 02:07
Chromium	1.8	0.10	1	08/07/2018 02:07
Cobalt	0.19	0.10	1	08/07/2018 02:07
Copper	16	0.10	1	08/07/2018 02:07
Lead	0.40	0.10	1	08/07/2018 02:07
Mercury	ND	0.010	1	08/07/2018 02:07
Molybdenum	0.13	0.10	1	08/07/2018 02:07
Nickel	5.7	0.10	1	08/07/2018 02:07
Selenium	ND	0.10	1	08/07/2018 02:07
Silver	ND	0.10	1	08/07/2018 02:07
Thallium	ND	0.10	1	08/07/2018 02:07
Vanadium	5.9	0.10	1	08/07/2018 02:07
Zinc	10	1.0	1	08/07/2018 02:07

Analyst(s): ND

(Cont.)

CA ELAP 1644 • NELAP 4033ORELAP



Analytical Report

Client: Fletcher Consultants, Inc.
Date Received: 8/3/18 15:32
Date Prepared: 8/4/18
Project: MCWP Closure Project

WorkOrder: 1808177
Extraction Method: CA Title 22
Analytical Method: SW6020
Unit: mg/L

CAM / CCR 17 Metals (STLC)

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MLS18-137	1808177-002A	Solid	08/02/2018 12:00	ICP-MS3 156SMPL.D	162712

Analyses	Result	RL	DE	Date Analyzed
Antimony	ND	0.10	1	08/07/2018 01:30
Arsenic	ND	0.10	1	08/07/2018 01:30
Barium	2.7	1.0	1	08/07/2018 01:30
Beryllium	ND	0.10	1	08/07/2018 01:30
Cadmium	ND	0.050	1	08/07/2018 01:30
Chromium	4.3	0.10	1	08/07/2018 01:30
Cobalt	0.32	0.10	1	08/07/2018 01:30
Copper	0.18	0.10	1	08/07/2018 01:30
Lead	0.88	0.10	1	08/07/2018 01:30
Mercury	0.019	0.010	1	08/07/2018 01:30
Molybdenum	0.46	0.10	1	08/07/2018 01:30
Nickel	7.5	0.10	1	08/07/2018 01:30
Selenium	ND	0.10	1	08/07/2018 01:30
Silver	ND	0.10	1	08/07/2018 01:30
Thallium	ND	0.10	1	08/07/2018 01:30
Vanadium	8.1	0.10	1	08/07/2018 01:30
Zinc	25	1.0	1	08/07/2018 01:30

Analyst(s): ND

(Cont.)

CA ELAP 1644 • NELAP 4033ORELAP



Analytical Report

Client: Fletcher Consultants, Inc.
Date Received: 8/3/18 15:32
Date Prepared: 8/4/18
Project: MCWP Closure Project

WorkOrder: 1808177
Extraction Method: CA Title 22
Analytical Method: SW6020
Unit: mg/L

CAM / CCR 17 Metals (STLC)

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MLS18-138	1808177-003A	Solid	08/02/2018 11:15	ICP-MS3 175SMPL.D	162712

Analytes	Result	RL	DE	Date Analyzed
Antimony	ND	0.10	1	08/07/2018 03:28
Arsenic	ND	0.10	1	08/07/2018 03:28
Barium	ND	1.0	1	08/07/2018 03:28
Beryllium	ND	0.10	1	08/07/2018 03:28
Cadmium	ND	0.050	1	08/07/2018 03:28
Chromium	0.29	0.10	1	08/07/2018 03:28
Cobalt	ND	0.10	1	08/07/2018 03:28
Copper	130	1.0	10	08/08/2018 03:19
Lead	ND	0.10	1	08/07/2018 03:28
Mercury	ND	0.010	1	08/07/2018 03:28
Molybdenum	ND	0.10	1	08/07/2018 03:28
Nickel	0.55	0.10	1	08/07/2018 03:28
Selenium	ND	0.10	1	08/07/2018 03:28
Silver	ND	0.10	1	08/07/2018 03:28
Thallium	ND	0.10	1	08/07/2018 03:28
Vanadium	0.47	0.10	1	08/07/2018 03:28
Zinc	240	1.0	1	08/07/2018 03:28

Analyst(s): ND

(Cont.)

CA ELAP 1644 • NELAP 4033ORELAP



Analytical Report

Client: Fletcher Consultants, Inc.
Date Received: 8/3/18 15:32
Date Prepared: 8/4/18
Project: MCWP Closure Project

WorkOrder: 1808177
Extraction Method: CA Title 22
Analytical Method: SW6020
Unit: mg/L

CAM / CCR 17 Metals (STLC)

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MLS18-139	1808177-004A	Solid	08/02/2018 11:30	ICP-MS3 150SMPL.D	162712

Analytes	Result	RL	DE	Date Analyzed
Antimony	ND	0.10	1	08/07/2018 00:52
Arsenic	ND	0.10	1	08/07/2018 00:52
Barium	ND	1.0	1	08/07/2018 00:52
Beryllium	ND	0.10	1	08/07/2018 00:52
Cadmium	ND	0.050	1	08/07/2018 00:52
Chromium	1.6	0.10	1	08/07/2018 00:52
Cobalt	ND	0.10	1	08/07/2018 00:52
Copper	1.7	0.10	1	08/07/2018 00:52
Lead	ND	0.10	1	08/07/2018 00:52
Mercury	ND	0.010	1	08/07/2018 00:52
Molybdenum	ND	0.10	1	08/07/2018 00:52
Nickel	3.2	0.10	1	08/07/2018 00:52
Selenium	ND	0.10	1	08/07/2018 00:52
Silver	ND	0.10	1	08/07/2018 00:52
Thallium	ND	0.10	1	08/07/2018 00:52
Vanadium	0.54	0.10	1	08/07/2018 00:52
Zinc	ND	1.0	1	08/07/2018 00:52

Analyst(s): ND



Analytical Report

Client: Fletcher Consultants, Inc.
Date Received: 8/3/18 15:32
Date Prepared: 8/3/18
Project: MCWP Closure Project

WorkOrder: 1808177
Extraction Method: SW3050B
Analytical Method: SW6020
Unit: mg/Kg

CAM / CCR 17 Metals + Misc. Elements

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MLS18-136	1808177-001A	Solid	08/02/2018 11:00	ICP-MS1 030SMPL.D	162689
Analytes	Result		RL	DE	Date Analyzed
Antimony	3.6		0.50	1	08/07/2018 12:20
Arsenic	16		0.50	1	08/07/2018 12:20
Barium	52		5.0	1	08/07/2018 12:20
Beryllium	ND		0.50	1	08/07/2018 12:20
Cadmium	0.78		0.25	1	08/07/2018 12:20
Chromium	610		25	50	08/07/2018 19:24
Cobalt	25		0.50	1	08/07/2018 12:20
Copper	610		25	50	08/07/2018 19:24
Iron	330,000		1000	50	08/07/2018 19:24
Lead	120		0.50	1	08/07/2018 12:20
Mercury	49		2.5	50	08/07/2018 19:24
Molybdenum	72		0.50	1	08/07/2018 12:20
Nickel	520		25	50	08/07/2018 19:24
Selenium	1.5		0.50	1	08/07/2018 12:20
Silver	ND		0.50	1	08/07/2018 12:20
Thallium	ND		0.50	1	08/07/2018 12:20
Vanadium	530		0.50	1	08/07/2018 12:20
Zinc	380		5.0	1	08/07/2018 12:20
Surrogates	REC (%)		Limits		
Terbium	100		70-130		08/07/2018 12:20
Analyst(s): ND					

(Cont.)

CA ELAP 1644 • NELAP 4033ORELAP



Analytical Report

Client: Fletcher Consultants, Inc.
Date Received: 8/3/18 15:32
Date Prepared: 8/3/18
Project: MCWP Closure Project

WorkOrder: 1808177
Extraction Method: SW3050B
Analytical Method: SW6020
Unit: mg/Kg

CAM / CCR 17 Metals + Misc. Elements

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MLS18-137	1808177-002A	Solid	08/02/2018 12:00	ICP-MS1 031SMPL.D	162689
<u>Analytes</u>	<u>Result</u>		<u>RL</u>	<u>DE</u>	<u>Date Analyzed</u>
Antimony	3.2		0.50	1	08/07/2018 12:26
Arsenic	10		0.50	1	08/07/2018 12:26
Barium	68		5.0	1	08/07/2018 12:26
Beryllium	ND		0.50	1	08/07/2018 12:26
Cadmium	1.2		0.25	1	08/07/2018 12:26
Chromium	340		0.50	1	08/07/2018 12:26
Cobalt	17		0.50	1	08/07/2018 12:26
Copper	380		0.50	1	08/07/2018 12:26
Iron	180,000		1000	50	08/07/2018 19:30
Lead	80		0.50	1	08/07/2018 12:26
Mercury	60		2.5	50	08/07/2018 19:30
Molybdenum	49		0.50	1	08/07/2018 12:26
Nickel	390		0.50	1	08/07/2018 12:26
Selenium	1.0		0.50	1	08/07/2018 12:26
Silver	ND		0.50	1	08/07/2018 12:26
Thallium	ND		0.50	1	08/07/2018 12:26
Vanadium	420		0.50	1	08/07/2018 12:26
Zinc	420		5.0	1	08/07/2018 12:26
<u>Surrogates</u>	<u>REC (%)</u>		<u>Limits</u>		
Terbium	102		70-130		08/07/2018 12:26
<u>Analyst(s):</u> ND					

(Cont.)

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Analytical Report

Client: Fletcher Consultants, Inc.
Date Received: 8/3/18 15:32
Date Prepared: 8/3/18
Project: MCWP Closure Project

WorkOrder: 1808177
Extraction Method: SW3050B
Analytical Method: SW6020
Unit: mg/Kg

CAM / CCR 17 Metals + Misc. Elements

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MLS18-138	1808177-003A	Solid	08/02/2018 11:15	ICP-MS1 032SMPL.D	162689
<u>Analytes</u>	<u>Result</u>		<u>RL</u>	<u>DE</u>	<u>Date Analyzed</u>
Antimony	ND		0.50	1	08/08/2018 18:50
Arsenic	ND		0.50	1	08/08/2018 18:50
Barium	6.2		5.0	1	08/08/2018 18:50
Beryllium	ND		0.50	1	08/08/2018 18:50
Cadmium	ND		0.25	1	08/08/2018 18:50
Chromium	4.9		0.50	1	08/08/2018 18:50
Cobalt	1.0		0.50	1	08/08/2018 18:50
Copper	47		0.50	1	08/08/2018 18:50
Iron	3800		20	1	08/08/2018 18:50
Lead	1.2		0.50	1	08/08/2018 18:50
Mercury	0.14		0.050	1	08/08/2018 18:50
Molybdenum	1.3		0.50	1	08/08/2018 18:50
Nickel	7.3		0.50	1	08/08/2018 18:50
Selenium	ND		0.50	1	08/08/2018 18:50
Silver	ND		0.50	1	08/08/2018 18:50
Thallium	ND		0.50	1	08/08/2018 18:50
Vanadium	7.4		0.50	1	08/08/2018 18:50
Zinc	40		5.0	1	08/08/2018 18:50
<u>Surrogates</u>	<u>REC (%)</u>		<u>Limits</u>		
Terbium	83		70-130		08/08/2018 18:50
<u>Analyst(s):</u>	ND				

(Cont.)

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Analytical Report

Client: Fletcher Consultants, Inc.
Date Received: 8/3/18 15:32
Date Prepared: 8/3/18
Project: MCWP Closure Project

WorkOrder: 1808177
Extraction Method: SW3050B
Analytical Method: SW6020
Unit: mg/Kg

CAM / CCR 17 Metals + Misc. Elements

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MLS18-139	1808177-004A	Solid	08/02/2018 11:30	ICP-MS1 101SMPL.D	162689
<u>Analytes</u>	<u>Result</u>		<u>RL</u>	<u>DE</u>	<u>Date Analyzed</u>
Antimony	ND		10	20	08/07/2018 19:37
Arsenic	22		10	20	08/07/2018 19:37
Barium	ND		100	20	08/07/2018 19:37
Beryllium	ND		10	20	08/07/2018 19:37
Cadmium	ND		5.0	20	08/07/2018 19:37
Chromium	600		10	20	08/07/2018 19:37
Cobalt	22		10	20	08/07/2018 19:37
Copper	570		10	20	08/07/2018 19:37
Iron	580,000		400	20	08/07/2018 19:37
Lead	66		10	20	08/07/2018 19:37
Mercury	ND		1.0	20	08/07/2018 19:37
Molybdenum	60		10	20	08/07/2018 19:37
Nickel	290		10	20	08/07/2018 19:37
Selenium	ND		10	20	08/07/2018 19:37
Silver	ND		10	20	08/07/2018 19:37
Thallium	ND		10	20	08/07/2018 19:37
Vanadium	250		10	20	08/07/2018 19:37
Zinc	ND		100	20	08/07/2018 19:37
<u>Surrogates</u>	<u>REC (%)</u>		<u>Limits</u>		
Terbium	101		70-130		08/07/2018 19:37
<u>Analyst(s):</u>	ND		<u>Analytical Comments:</u>	a1	



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http://www.mcccampbell.com / E-mail: main@mcccampbell.com

Analytical Report

Client: Fletcher Consultants, Inc.

Date Received: 8/3/18 15:32

Date Prepared: 8/3/18-8/6/18

Project: MCWP Closure Project

WorkOrder: 1808177

Extraction Method: SW9045C

Analytical Method: SW9045C

Unit: pH units @ 25°C

pH

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MLS18-136	1808177-001A	Solid	08/02/2018 11:00	WetChem	162693

Analytes	Result	Accuracy	DE	Date Analyzed
pH	6.43	±0.1	1	08/03/2018 16:06

Analyst(s): PHU

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MLS18-137	1808177-002A	Solid	08/02/2018 12:00	WetChem	162693

Analytes	Result	Accuracy	DE	Date Analyzed
pH	6.72	±0.1	1	08/03/2018 16:09

Analyst(s): PHU

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MLS18-138	1808177-003A	Solid	08/02/2018 11:15	WetChem	162752

Analytes	Result	Accuracy	DE	Date Analyzed
pH	7.85	±0.1	1	08/06/2018 13:30

Analyst(s): PHU

Analytical Comments: g3

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MLS18-139	1808177-004A	Solid	08/02/2018 11:30	WetChem	162693

Analytes	Result	Accuracy	DE	Date Analyzed
pH	4.03	±0.1	1	08/03/2018 16:12

Analyst(s): PHU

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Analytical Report

Client: Fletcher Consultants, Inc.
Date Received: 8/3/18 15:32
Date Prepared: 8/5/18
Project: MCWP Closure Project

WorkOrder: 1808177
Extraction Method: SW1311/SW3010
Analytical Method: SW6020
Unit: mg/L

Metals (TCLP)

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MLS18-136	1808177-001A	Solid	08/02/2018 11:00	ICP-MS3 087SMPL.D	162719
<u>Analytes</u>	<u>Result</u>		<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
Arsenic	ND		0.10	1	08/06/2018 18:22
Barium	ND		1.0	1	08/06/2018 18:22
Cadmium	ND		0.050	1	08/06/2018 18:22
Chromium	ND		0.10	1	08/06/2018 18:22
Lead	ND		0.10	1	08/06/2018 18:22
Mercury	ND		0.010	1	08/06/2018 18:22
Selenium	ND		0.10	1	08/06/2018 18:22
Silver	ND		0.10	1	08/06/2018 18:22

Analyst(s): MIG

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MLS18-137	1808177-002A	Solid	08/02/2018 12:00	ICP-MS3 088SMPL.D	162719
<u>Analytes</u>	<u>Result</u>		<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
Arsenic	ND		0.10	1	08/06/2018 18:28
Barium	ND		1.0	1	08/06/2018 18:28
Cadmium	ND		0.050	1	08/06/2018 18:28
Chromium	ND		0.10	1	08/06/2018 18:28
Lead	ND		0.10	1	08/06/2018 18:28
Mercury	ND		0.010	1	08/06/2018 18:28
Selenium	ND		0.10	1	08/06/2018 18:28
Silver	ND		0.10	1	08/06/2018 18:28

Analyst(s): MIG

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Analytical Report

Client: Fletcher Consultants, Inc.
Date Received: 8/3/18 15:32
Date Prepared: 8/5/18
Project: MCWP Closure Project

WorkOrder: 1808177
Extraction Method: SW1311/SW3010
Analytical Method: SW6020
Unit: mg/L

Metals (TCLP)

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MLS18-138	1808177-003A	Solid	08/02/2018 11:15	ICP-MS3 089SMPL.D	162719

Analytes	Result	RL	DE	Date Analyzed
Arsenic	ND	0.10	1	08/06/2018 18:35
Barium	ND	1.0	1	08/06/2018 18:35
Cadmium	ND	0.050	1	08/06/2018 18:35
Chromium	ND	0.10	1	08/06/2018 18:35
Lead	ND	0.10	1	08/06/2018 18:35
Mercury	ND	0.010	1	08/06/2018 18:35
Selenium	ND	0.10	1	08/06/2018 18:35
Silver	ND	0.10	1	08/06/2018 18:35

Analyst(s): MIG

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MLS18-139	1808177-004A	Solid	08/02/2018 11:30	ICP-MS3 090SMPL.D	162719

Analytes	Result	RL	DE	Date Analyzed
Arsenic	ND	0.10	1	08/06/2018 18:41
Barium	ND	1.0	1	08/06/2018 18:41
Cadmium	ND	0.050	1	08/06/2018 18:41
Chromium	ND	0.10	1	08/06/2018 18:41
Lead	ND	0.10	1	08/06/2018 18:41
Mercury	ND	0.010	1	08/06/2018 18:41
Selenium	ND	0.10	1	08/06/2018 18:41
Silver	ND	0.10	1	08/06/2018 18:41

Analyst(s): MIG



McC Campbell Analytical, Inc.

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1534 Willow Pass Road, Pittsburg, CA 94565-1701
Toll Free Telephone: (877) 252-9262 / Fax: (925) 252-9269
<http://www.mcccampbell.com> / E-mail: main@mcccampbell.com

Quality Control Report

Client: Fletcher Consultants, Inc.

Date Prepared: 8/4/18

Date Analyzed: 8/6/18

Instrument: ICP-MS3

Matrix: Soil

Project: MCWP Closure Project

WorkOrder: 1808177

BatchID: 162712

Extraction Method: CA Title 22

Analytical Method: SW6020

Unit: mg/L

Sample ID: MB/LCS/LCSD-162712

QC Summary Report for Metals (STLC)

Analyte	MB Result	RL			
Antimony	ND	0.10	-	-	-
Arsenic	ND	0.10	-	-	-
Barium	ND	1.0	-	-	-
Beryllium	ND	0.10	-	-	-
Cadmium	ND	0.050	-	-	-
Chromium	ND	0.10	-	-	-
Cobalt	ND	0.10	-	-	-
Copper	ND	0.10	-	-	-
Lead	ND	0.10	-	-	-
Mercury	ND	0.010	-	-	-
Molybdenum	ND	0.10	-	-	-
Nickel	ND	0.10	-	-	-
Selenium	ND	0.10	-	-	-
Silver	ND	0.10	-	-	-
Thallium	ND	0.10	-	-	-
Vanadium	ND	0.10	-	-	-
Zinc	ND	1.0	-	-	-

(Cont.)

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Quality Control Report

Client: Fletcher Consultants, Inc.
Date Prepared: 8/4/18
Date Analyzed: 8/6/18
Instrument: ICP-MS3
Matrix: Soil
Project: MCWP Closure Project

WorkOrder: 1808177
BatchID: 162712
Extraction Method: CA Title 22
Analytical Method: SW6020
Unit: mg/L
Sample ID: MB/LCS/LCSD-162712

QC Summary Report for Metals (STLC)

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
Antimony	10.8	10.8	10	108	108	75-125	0	20
Arsenic	9.97	9.96	10	100	100	75-125	0	20
Barium	102	101	100	102	101	75-125	1.20	20
Beryllium	9.88	9.83	10	99	98	75-125	0.528	20
Cadmium	9.77	9.62	10	98	96	75-125	1.59	20
Chromium	9.64	9.68	10	96	97	75-125	0.414	20
Cobalt	9.57	9.57	10	96	96	75-125	0	20
Copper	9.70	9.69	10	97	97	75-125	0	20
Lead	9.74	9.68	10	97	97	75-125	0	20
Mercury	0.239	0.250	0.25	96	100	75-125	4.50	20
Molybdenum	10.2	10.2	10	102	102	75-125	0	20
Nickel	9.83	9.84	10	98	98	75-125	0	20
Selenium	9.95	9.94	10	100	99	75-125	0.141	20
Silver	10.1	10.0	10	101	100	75-125	0.993	20
Thallium	9.76	9.65	10	98	97	75-125	1.11	20
Vanadium	9.66	9.55	10	97	96	75-125	1.10	20
Zinc	97.8	97.6	100	98	98	75-125	0	20



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Quality Control Report

Client: Fletcher Consultants, Inc.
Date Prepared: 8/3/18
Date Analyzed: 8/6/18
Instrument: ICP-MS1
Matrix: Soil
Project: MCWP Closure Project

WorkOrder: 1808177
BatchID: 162689
Extraction Method: SW3050B
Analytical Method: SW6020
Unit: mg/Kg
Sample ID: MB/LCS/LCSD-162689

QC Summary Report for Metals

Analyte	MB Result	RL	SPK Val	MB SS %REC	MB SS Limits
Antimony	ND	0.50	-	-	-
Arsenic	ND	0.50	-	-	-
Barium	ND	5.0	-	-	-
Beryllium	ND	0.50	-	-	-
Cadmium	ND	0.25	-	-	-
Chromium	ND	0.50	-	-	-
Cobalt	ND	0.50	-	-	-
Copper	ND	0.50	-	-	-
Iron	ND	20	-	-	-
Lead	ND	0.50	-	-	-
Mercury	ND	0.050	-	-	-
Molybdenum	ND	0.50	-	-	-
Nickel	ND	0.50	-	-	-
Selenium	ND	0.50	-	-	-
Silver	ND	0.50	-	-	-
Thallium	ND	0.50	-	-	-
Vanadium	ND	0.50	-	-	-
Zinc	ND	5.0	-	-	-
Surrogate Recovery					
Terbium	521		500	104	70-130

(Cont.)

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<http://www.mcccampbell.com> / E-mail: main@mcccampbell.com

Quality Control Report

Client: Fletcher Consultants, Inc.
Date Prepared: 8/3/18
Date Analyzed: 8/6/18
Instrument: ICP-MS1
Matrix: Soil
Project: MCWP Closure Project

WorkOrder: 1808177
BatchID: 162689
Extraction Method: SW3050B
Analytical Method: SW6020
Unit: mg/Kg
Sample ID: MB/LCS/LCSD-162689

QC Summary Report for Metals

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
Antimony	53.5	52.2	50	107	104	75-125	2.57	20
Arsenic	51.4	50.7	50	103	101	75-125	1.49	20
Barium	536	522	500	107	104	75-125	2.59	20
Beryllium	52.8	51.2	50	106	102	75-125	2.92	20
Cadmium	51.6	50.2	50	103	100	75-125	2.65	20
Chromium	52.3	51.0	50	105	102	75-125	2.52	20
Cobalt	50.5	49.3	50	101	99	75-125	2.38	20
Copper	51.9	50.9	50	104	102	75-125	1.89	20
Iron	5100	5010	5000	102	100	75-125	1.66	20
Lead	51.6	49.9	50	103	100	75-125	3.21	20
Mercury	1.25	1.25	1.25	100	100	75-125	0	20
Molybdenum	51.8	50.1	50	104	100	75-125	3.33	20
Nickel	52.6	51.0	50	105	102	75-125	3.05	20
Selenium	51.3	50.0	50	103	100	75-125	2.51	20
Silver	53.1	51.4	50	106	103	75-125	3.18	20
Thallium	50.6	48.9	50	101	98	75-125	3.54	20
Vanadium	52.2	50.8	50	104	102	75-125	2.68	20
Zinc	519	508	500	104	102	75-125	2.12	20
Surrogate Recovery								
Terbium	534	521	500	107	104	70-130	2.48	20



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Quality Control Report

Client: Fletcher Consultants, Inc.
Date Prepared: 8/3/18
Date Analyzed: 8/3/18
Instrument: WetChem
Matrix: Soil
Project: MCWP Closure Project

WorkOrder: 1808177
BatchID: 162693
Extraction Method: SW9045C
Analytical Method: SW9045C
Unit: pH units @ 25°C

QC Summary Report for pH

SampleID	Sample Result	Sample DF	Dup / Serial Dilution Result	Dup / Serial Dilution DF	Precision	Acceptance Criteria
1808172-001A	7.43	1	7.41	1	0.02	0.1

Client: Fletcher Consultants, Inc.
Date Prepared: 8/6/18
Date Analyzed: 8/6/18
Instrument: WetChem
Matrix: Soil
Project: MCWP Closure Project

WorkOrder: 1808177
BatchID: 162752
Extraction Method: SW9045C
Analytical Method: SW9045C
Unit: pH units @ 25°C

QC Summary Report for pH

SampleID	Sample Result	Sample DF	Dup / Serial Dilution Result	Dup / Serial Dilution DF	Precision	Acceptance Criteria
1808164-001A	11.41	1	11.41	1	0	0.1

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Quality Control Report

Client: Fletcher Consultants, Inc.**Date Prepared:** 8/5/18**Date Analyzed:** 8/6/18**Instrument:** ICP-MS3**Matrix:** Soil**Project:** MCWP Closure Project**WorkOrder:** 1808177**BatchID:** 162719**Extraction Method:** SW1311/SW3010**Analytical Method:** SW6020**Unit:** mg/L**Sample ID:** MB/LCS/LCSD-162719

QC Summary Report for Metals (TCLP)

Analyte	MB Result	RL			
Arsenic	ND	0.10	-	-	-
Barium	ND	1.0	-	-	-
Cadmium	ND	0.050	-	-	-
Chromium	ND	0.10	-	-	-
Lead	ND	0.10	-	-	-
Mercury	ND	0.010	-	-	-
Selenium	ND	0.10	-	-	-
Silver	ND	0.10	-	-	-

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
Arsenic	9.66	9.63	10	97	96	75-125	0.249	20
Barium	100	98.6	100	100	99	75-125	1.43	20
Cadmium	9.39	9.23	10	94	92	75-125	1.78	20
Chromium	9.23	9.09	10	92	91	75-125	1.53	20
Lead	9.53	9.30	10	95	93	75-125	2.38	20
Mercury	0.233	0.230	0.25	93	92	75-125	1.55	20
Selenium	9.71	9.62	10	97	96	75-125	0.952	20
Silver	9.84	9.77	10	98	98	75-125	0	20

McC Campbell Analytical, Inc.



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Pittsburg, CA 94565-1701
(925) 252-9262

CHAIN-OF-CUSTODY RECORD

Page 1 of 1

WorkOrder: 1808177

ClientCode: FC

☐ WaterTrax

☐ WriteOn

☐ EDF

☐ Excel

☒ EQULS

☐ Email

☐ HardCopy

☐ ThirdParty

☐ J-flag

☒ Detection Summary

☒ Dry-Weight

Report to:

Craig R. Fletcher
Fletcher Consultants, Inc.
4858 Harbord Drive
Oakland, CA 94618
(510) 654-3486 FAX: (510) 654-3399

Email: fci2000@sbcglobal.net; craig@fletchercon
cc/3rd Party: emie.bloecher@vistroenergy.com;
PO:
Project: MCWP Closure Project

Bill to:

Craig R. Fletcher
Fletcher Consultants, Inc.
4858 Harbord Drive
Oakland, CA 94618

Requested TAT: 5 days;

Date Received: 08/03/2018

Date Logged: 08/03/2018

Lab ID	Client ID	Matrix	Collection Date	Hold	Requested Tests (See legend below)											
					1	2	3	4	5	6	7	8	9	10	11	12
1808177-001	MLS18-136	Solid	8/2/2018 11:00	<input type="checkbox"/>	A	A	A	A								
1808177-002	MLS18-137	Solid	8/2/2018 12:00	<input type="checkbox"/>	A	A	A	A								
1808177-003	MLS18-138	Solid	8/2/2018 11:15	<input type="checkbox"/>	A	A	A	A								
1808177-004	MLS18-139	Solid	8/2/2018 11:30	<input type="checkbox"/>	A	A	A	A								

Test Legend:

1	CAM17MS_STLC_S
5	
9	

2	CAMMETMS_TTLC_S
6	
10	

3	PH_S
7	
11	

4	RCRAMS_TCLP_S
8	
12	

Prepared by: Agustina Venegas

Comments:

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days).
Hazardous samples will be returned to client or disposed of at client expense.



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WORK ORDER SUMMARY

Client Name: FLETCHER CONSULTANTS, INC.

Project: MCWP Closure Project

Work Order: 1808177

Client Contact: Craig R. Fletcher

QC Level: LEVEL 2

Contact's Email: fci2000@sbcglobal.net;
craig@fletcherconsultantsinc.com

Comments:

Date Logged: 8/3/2018

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ Fax ☐ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Lab ID	Client ID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	De-chlorinated	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1808177-001A	MLS18-136	Solid	SW6020 (RCRA Metals) (TCLP)	1	16OZ GJ, Unpres	<input type="checkbox"/>	8/2/2018 11:00	5 days*		<input type="checkbox"/>	
			SW9045C (pH)			<input type="checkbox"/>		5 days		<input type="checkbox"/>	
			SW6020 (Metals) <Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Mercury, Molybdenum, Nickel, Selenium, Silver, Thallium, Vanadium, Zinc>			<input type="checkbox"/>		5 days		<input type="checkbox"/>	
			SW6020 (CAM 17) (STLC)			<input type="checkbox"/>		5 days*		<input type="checkbox"/>	
1808177-002A	MLS18-137	Solid	SW6020 (RCRA Metals) (TCLP)	1	16OZ GJ, Unpres	<input type="checkbox"/>	8/2/2018 12:00	5 days*		<input type="checkbox"/>	
			SW9045C (pH)			<input type="checkbox"/>		5 days		<input type="checkbox"/>	
			SW6020 (Metals) <Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Mercury, Molybdenum, Nickel, Selenium, Silver, Thallium, Vanadium, Zinc>			<input type="checkbox"/>		5 days		<input type="checkbox"/>	
			SW6020 (CAM 17) (STLC)			<input type="checkbox"/>		5 days*		<input type="checkbox"/>	
1808177-003A	MLS18-138	Solid	SW6020 (RCRA Metals) (TCLP)	1	16OZ GJ, Unpres	<input type="checkbox"/>	8/2/2018 11:15	5 days*		<input type="checkbox"/>	
			SW9045C (pH)			<input type="checkbox"/>		5 days		<input type="checkbox"/>	

NOTES: - STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).

- MAI assumes that all material present in the provided sampling container is considered part of the sample - MAI does not exclude any material from the sample prior to sample preparation unless requested in writing by the client.



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WORK ORDER SUMMARY

Client Name: FLETCHER CONSULTANTS, INC.

Project: MCWP Closure Project

Work Order: 1808177

Client Contact: Craig R. Fletcher

QC Level: LEVEL 2

Contact's Email: fci2000@sbcglobal.net;
 craig@fletcherconsultantsinc.com

Comments:

Date Logged: 8/3/2018

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ Fax ☐ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Lab ID	Client ID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	De-chlorinated	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1808177-003A	MLS18-138	Solid	SW6020 (Metals) <Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Mercury, Molybdenum, Nickel, Selenium, Silver, Thallium, Vanadium, Zinc> SW6020 (CAM 17) (STLC)	1	16OZ GI, Unpres	<input type="checkbox"/>	8/2/2018 11:15	5 days		<input type="checkbox"/>	
						<input type="checkbox"/>		5 days*		<input type="checkbox"/>	
1808177-004A	MLS18-139	Solid	SW6020 (RCRA Metals) (TCLP) SW9045C (pH) SW6020 (Metals) <Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Mercury, Molybdenum, Nickel, Selenium, Silver, Thallium, Vanadium, Zinc> SW6020 (CAM 17) (STLC)	1	16OZ GI, Unpres	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	8/2/2018 11:30	5 days* 5 days 5 days		<input type="checkbox"/>	
						<input type="checkbox"/>		5 days*		<input type="checkbox"/>	

NOTES: - STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).

- MAI assumes that all material present in the provided sampling container is considered part of the sample - MAI does not exclude any material from the sample prior to sample preparation unless requested in writing by the client.

1808177

MOSS LANDING POWER PLANT

Post Office Box 690 * Moss Landing, California 95039 * (831) 633-6786

CHAIN OF CUSTODY RECORD

Page 1 of 1

PROJECT NAME: MCWP Closure Project						Analysis Required						Remarks			
SAMPLERS (signature)						Report Attention:									
<div style="display: flex; justify-content: space-between;"> <div> <p>Signature: <i>Richard Carrillo</i></p> <p>Print Name: ERNIE BLOECHER</p> </div> <div> <p>TCLP metals (RCRA 8)</p> <p>THLE 22 WET metals CAM 17</p> <p>TCLC CAM 17 metals</p> <p>IRON</p> <p>PH</p> </div> </div>												<p>1-week Turnaround requested</p> <p>ernie.bloecher@vistraenergy.com</p>			
SAMPLE LOCATION	DATE SAMPLED	TIME SAMPLED	COMP	GRAB	SAMPLE NUMBER AND DESCRIPTION	No of containers	Volume Quantity (cc)	TCLP metals	THLE 22 WET metals	TCLC CAM 17	IRON		PH		
MCWP #192	8/2/18	1100		X	MLS18-136	1	500	X	X	X	X	X			
2-55 drums of solids															
From MCWP Filter F1 Hering MCWP #1,2 Flushing Water															
MCWP #3	8/2/18	1200		X	MLS18-137	1	500	X	X	X	X	X			
1-55 drum of solids															
From F1 Hering MCWP #3 Flushing Water															
Haz pad	8/2/18	1115		X	MLS18-138	1		X	X	X	X	X			
3-55 gal. drums of Filter Cloths from Old Filter Press															
					MLS18-139	1		X	X	X	X	X			
Haz pad	8/2/18	1130		X	4-55 gal. drums of solid from										
MCWP Samps of A697 (white Fiberglass Tanks)															
Signature						Print Name						Company		Date	Time
Relinquished by <i>Richard Carrillo</i>						RICHARD CARRILLO						Dynasty		8/2/18	1515
Received by <i>Craig R. Fletcher</i>						CRAIG R. FLETCHER						SCI		8/2/18	1515
Relinquished by <i>Craig R. Fletcher</i>						CRAIG R. FLETCHER						FLI		8/3/18	1532
Received by <i>Jana Alford</i>						JANA ALFORD						MAI		8/3/18	1532
Relinquished by															
Received by Laboratory															

Samples going to: 2.0 net

Record contract laboratory's name, address, and phone # before transporting or shipping

8772529262

McCampbell Analytical
1534 Willow Ridge Rd
Pittsburg CA 94565

→ BILL TO FLETCHER CONSULTANTS, INC



Sample Receipt Checklist

Client Name: **Fletcher Consultants, Inc.**
Project: **MCWP Closure Project**

Date and Time Received: **8/3/2018 15:32**
Date Logged: **8/3/2018**
Received by: **Jena Alfaro**
Logged by: **Agustina Venegas**

WorkOrder No: **1808177** Matrix: Solid
Carrier: Client Drop-In

Chain of Custody (COC) Information

Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample IDs noted by Client on COC?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Date and Time of collection noted by Client on COC?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sampler's name noted on COC?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
COC agrees with Quote?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	NA <input checked="" type="checkbox"/>

Sample Receipt Information

Custody seals intact on shipping container/cooler?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	NA <input checked="" type="checkbox"/>
Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper containers/bottles?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	

Sample Preservation and Hold Time (HT) Information

All samples received within holding time?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	NA <input type="checkbox"/>
Samples Received on Ice?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	

(Ice Type: WET ICE)

Sample/Temp Blank temperature	Temp: 2°C	NA <input type="checkbox"/>
Water - VOA vials have zero headspace / no bubbles?	Yes <input type="checkbox"/> No <input type="checkbox"/>	NA <input checked="" type="checkbox"/>
Sample labels checked for correct preservation?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
pH acceptable upon receipt (Metal: <2; 522: <4; 218.7: >8)?	Yes <input type="checkbox"/> No <input type="checkbox"/>	NA <input checked="" type="checkbox"/>

UCMR Samples:

pH tested and acceptable upon receipt (200.8: ≤2; 525.3: ≤4; 530: ≤7; 541: <3; 544: <6.5 & 7.5)?	Yes <input type="checkbox"/> No <input type="checkbox"/>	NA <input checked="" type="checkbox"/>
Free Chlorine tested and acceptable upon receipt (<0.1mg/L)?	Yes <input type="checkbox"/> No <input type="checkbox"/>	NA <input checked="" type="checkbox"/>

Comments:



McC Campbell Analytical, Inc.

"When Quality Counts"

Analytical Report

WorkOrder: 1808177

Report Created for: Fletcher Consultants, Inc.

4858 Harbord Drive
Oakland, CA 94618

Project Contact: Craig R. Fletcher

Project P.O.:

Project: MCWP Closure Project

Project Received: 08/03/2018

Analytical Report reviewed & approved for release on 08/08/2018 by:

Jennifer Lagerbom
Project Manager

The report shall not be reproduced except in full, without the written approval of the laboratory. The analytical results relate only to the items tested. Results reported conform to the most current NELAP standards, where applicable, unless otherwise stated in the case narrative.



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CA ELAP 1644 ♦ NELAP 4033 ORELAP

Solids from Filtering/Solids from Fiberglass Bores/
Filter Press cloths from planks



Glossary of Terms & Qualifier Definitions

Client: Fletcher Consultants, Inc.

Project: MCWP Closure Project

WorkOrder: 1808177

Glossary Abbreviation

%D	Serial Dilution Percent Difference
95% Interval	95% Confident Interval
DF	Dilution Factor
DI WET	(DISTLC) Waste Extraction Test using DI water
DISS	Dissolved (direct analysis of 0.45 µm filtered and acidified water sample)
DLT	Dilution Test (Serial Dilution)
DUP	Duplicate
EDL	Estimated Detection Limit
ERS	External reference sample. Second source calibration verification.
ITEF	International Toxicity Equivalence Factor
LCS	Laboratory Control Sample
MB	Method Blank
MB % Rec	% Recovery of Surrogate in Method Blank, if applicable
MDL	Method Detection Limit
ML	Minimum Level of Quantitation
MS	Matrix Spike
MSD	Matrix Spike Duplicate
N/A	Not Applicable
ND	Not detected at or above the indicated MDL or RL
NR	Data Not Reported due to matrix interference or insufficient sample amount.
PDS	Post Digestion Spike
PDSD	Post Digestion Spike Duplicate
PF	Prep Factor
RD	Relative Difference
RL	Reporting Limit (The RL is the lowest calibration standard in a multipoint calibration.)
RPD	Relative Percent Deviation
RRT	Relative Retention Time
SPK Val	Spike Value
SPKRef Val	Spike Reference Value
SPLP	Synthetic Precipitation Leachate Procedure
ST	Sorbent Tube
TCLP	Toxicity Characteristic Leachate Procedure
TEQ	Toxicity Equivalents
WET (STLC)	Waste Extraction Test (Soluble Threshold Limit Concentration)



Glossary of Terms & Qualifier Definitions

Client: Fletcher Consultants, Inc.
Project: MCWP Closure Project
WorkOrder: 1808177

Analytical Qualifiers

a1 Sample diluted due to matrix interference
g3 pH sample volume was reduced due to nature of the sample.



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Analytical Report

Client: Fletcher Consultants, Inc.
Date Received: 8/3/18 15:32
Date Prepared: 8/4/18
Project: MCWP Closure Project

WorkOrder: 1808177
Extraction Method: CA Title 22
Analytical Method: SW6020
Unit: mg/L

Drums - Solids
from Piping Flush H₂O
Plc 2

CAM / CCR 17 Metals (STLC)

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MLS18-136	1808177-001A	Solid	08/02/2018 11:00	ICP-MS3 162SMPL.D	162712

Analytes	Result	RL	DE	Date Analyzed
Antimony	ND	0.10	1	08/07/2018 02:07
Arsenic	ND	0.10	1	08/07/2018 02:07
Barium	1.5	1.0	1	08/07/2018 02:07
Beryllium	ND	0.10	1	08/07/2018 02:07
Cadmium	ND	0.050	1	08/07/2018 02:07
Chromium	1.8	0.10	1	08/07/2018 02:07
Cobalt	0.19	0.10	1	08/07/2018 02:07
Copper	16	0.10	1	08/07/2018 02:07
Lead	0.40	0.10	1	08/07/2018 02:07
Mercury	ND	0.010	1	08/07/2018 02:07
Molybdenum	0.13	0.10	1	08/07/2018 02:07
Nickel	5.7	0.10	1	08/07/2018 02:07
Selenium	ND	0.10	1	08/07/2018 02:07
Silver	ND	0.10	1	08/07/2018 02:07
Thallium	ND	0.10	1	08/07/2018 02:07
Vanadium	5.9	0.10	1	08/07/2018 02:07
Zinc	10	1.0	1	08/07/2018 02:07

Analyst(s): ND

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Analytical Report

Client: Fletcher Consultants, Inc.
Date Received: 8/3/18 15:32
Date Prepared: 8/4/18
Project: MCWP Closure Project

WorkOrder: 1808177
Extraction Method: CA Title 22
Analytical Method: SW6020
Unit: mg/L

*Solids from filtering
P#3 Flush H₂O*

CAM / CCR 17 Metals (STLC)

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MLS18-137	1808177-002A	Solid	08/02/2018 12:00	ICP-MS3 156SMPL.D	162712

Analytes	Result	RL	DE	Date Analyzed
Antimony	ND	0.10	1	08/07/2018 01:30
Arsenic	ND	0.10	1	08/07/2018 01:30
Barium	2.7	1.0	1	08/07/2018 01:30
Beryllium	ND	0.10	1	08/07/2018 01:30
Cadmium	ND	0.050	1	08/07/2018 01:30
Chromium	4.3	0.10	1	08/07/2018 01:30
Cobalt	0.32	0.10	1	08/07/2018 01:30
Copper	0.18	0.10	1	08/07/2018 01:30
Lead	0.88	0.10	1	08/07/2018 01:30
Mercury	0.019	0.010	1	08/07/2018 01:30
Molybdenum	0.46	0.10	1	08/07/2018 01:30
Nickel	7.5	0.10	1	08/07/2018 01:30
Selenium	ND	0.10	1	08/07/2018 01:30
Silver	ND	0.10	1	08/07/2018 01:30
Thallium	ND	0.10	1	08/07/2018 01:30
Vanadium	8.1	0.10	1	08/07/2018 01:30
Zinc	25	1.0	1	08/07/2018 01:30

Analyst(s): ND

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Analytical Report

Client: Fletcher Consultants, Inc.
Date Received: 8/3/18 15:32
Date Prepared: 8/4/18
Project: MCWP Closure Project

WorkOrder: 1808177
Extraction Method: CA Title 22
Analytical Method: SW6020
Unit: mg/L

from
Filter clothes - Filter
Press Plates

CAM / CCR 17 Metals (STLC)

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MLS18-138	1808177-003A	Solid	08/02/2018 11:15	ICP-MS3 175SMPL.D	162712
Analytes	Result	RL	DE	Date Analyzed	
Antimony	ND	0.10	1	08/07/2018 03:28	
Arsenic	ND	0.10	1	08/07/2018 03:28	
Barium	ND	1.0	1	08/07/2018 03:28	
Beryllium	ND	0.10	1	08/07/2018 03:28	
Cadmium	ND	0.050	1	08/07/2018 03:28	
Chromium	0.29	0.10	1	08/07/2018 03:28	
Cobalt	ND	0.10	1	08/07/2018 03:28	
Copper	130	1.0	10	08/08/2018 03:19	
Lead	ND	0.10	1	08/07/2018 03:28	
Mercury	ND	0.010	1	08/07/2018 03:28	
Molybdenum	ND	0.10	1	08/07/2018 03:28	
Nickel	0.55	0.10	1	08/07/2018 03:28	
Selenium	ND	0.10	1	08/07/2018 03:28	
Silver	ND	0.10	1	08/07/2018 03:28	
Thallium	ND	0.10	1	08/07/2018 03:28	
Vanadium	0.47	0.10	1	08/07/2018 03:28	
Zinc	240	1.0	1	08/07/2018 03:28	

Analyst(s): ND

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Analytical Report

Client: Fletcher Consultants, Inc.
Date Received: 8/3/18 15:32
Date Prepared: 8/4/18
Project: MCWP Closure Project

WorkOrder: 1808177
Extraction Method: CA Title 22
Analytical Method: SW6020
Unit: mg/L

Solids V6+7 fiberglass tanks

CAM / CCR 17 Metals (STLC)

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MLS18-139	1808177-004A	Solid	08/02/2018 11:30	ICP-MS3 150SMPL.D	162712

Analytes	Result	RL	DE	Date Analyzed
Antimony	ND	0.10	1	08/07/2018 00:52
Arsenic	ND	0.10	1	08/07/2018 00:52
Barium	ND	1.0	1	08/07/2018 00:52
Beryllium	ND	0.10	1	08/07/2018 00:52
Cadmium	ND	0.050	1	08/07/2018 00:52
Chromium	1.6	0.10	1	08/07/2018 00:52
Cobalt	ND	0.10	1	08/07/2018 00:52
Copper	1.7	0.10	1	08/07/2018 00:52
Lead	ND	0.10	1	08/07/2018 00:52
Mercury	ND	0.010	1	08/07/2018 00:52
Molybdenum	ND	0.10	1	08/07/2018 00:52
Nickel	3.2	0.10	1	08/07/2018 00:52
Selenium	ND	0.10	1	08/07/2018 00:52
Silver	ND	0.10	1	08/07/2018 00:52
Thallium	ND	0.10	1	08/07/2018 00:52
Vanadium	0.54	0.10	1	08/07/2018 00:52
Zinc	ND	1.0	1	08/07/2018 00:52

Analyst(s): ND



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Analytical Report

Client: Fletcher Consultants, Inc.
Date Received: 8/3/18 15:32
Date Prepared: 8/3/18
Project: MCWP Closure Project

WorkOrder: 1808177
Extraction Method: SW3050B
Analytical Method: SW6020
Unit: mg/Kg

Solids, pipe-flush
H₂O, Ponds 1+2

CAM / CCR 17 Metals + Misc. Elements

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MLS18-136	1808177-001A	Solid	08/02/2018 11:00	ICP-MS1 030SMPL.D	162689

Analytes	Result	RL	DE	Date Analyzed
Antimony	3.6	0.50	1	08/07/2018 12:20
Arsenic	16	0.50	1	08/07/2018 12:20
Barium	62	5.0	1	08/07/2018 12:20
Beryllium	ND	0.50	1	08/07/2018 12:20
Cadmium	0.78	0.25	1	08/07/2018 12:20
Chromium	610	25	50	08/07/2018 19:24
Cobalt	25	0.50	1	08/07/2018 12:20
Copper	610	25	50	08/07/2018 19:24
Iron	330,000	1000	50	08/07/2018 19:24
Lead	120	0.50	1	08/07/2018 12:20
Mercury	49	2.5	50	08/07/2018 19:24
Molybdenum	72	0.50	1	08/07/2018 12:20
Nickel	520	25	50	08/07/2018 19:24
Selenium	1.5	0.50	1	08/07/2018 12:20
Silver	ND	0.50	1	08/07/2018 12:20
Thallium	ND	0.50	1	08/07/2018 12:20
Vanadium	530	0.50	1	08/07/2018 12:20
Zinc	380	5.0	1	08/07/2018 12:20

Surrogates	REC (%)	Limits	
Terbium	100	70-130	08/07/2018 12:20

Analyst(s): ND

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Analytical Report

Client: Fletcher Consultants, Inc.
Date Received: 8/3/18 15:32
Date Prepared: 8/3/18
Project: MCWP Closure Project

WorkOrder: 1808177
Extraction Method: SW3050B
Analytical Method: SW6020
Unit: mg/Kg

*Solids for filling
Pond #3 flush water*

CAM / CCR 17 Metals + Misc. Elements

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MLS18-137	1808177-002A	Solid	08/02/2018 12:00	ICP-MS1 031SMPL.D	162689
<u>Analytes</u>	<u>Result</u>		<u>RL</u>	<u>DE</u>	<u>Date Analyzed</u>
Antimony	3.2		0.50	1	08/07/2018 12:26
Arsenic	10		0.50	1	08/07/2018 12:26
Barium	68		5.0	1	08/07/2018 12:26
Beryllium	ND		0.50	1	08/07/2018 12:26
Cadmium	1.2		0.25	1	08/07/2018 12:26
Chromium	340		0.50	1	08/07/2018 12:26
Cobalt	17		0.50	1	08/07/2018 12:26
Copper	380		0.50	1	08/07/2018 12:26
Iron	180,000		1000	50	08/07/2018 19:30
Lead	80		0.50	1	08/07/2018 12:26
Mercury	60		2.5	50	08/07/2018 19:30
Molybdenum	49		0.50	1	08/07/2018 12:26
Nickel	390		0.50	1	08/07/2018 12:26
Selenium	1.0		0.50	1	08/07/2018 12:26
Silver	ND		0.50	1	08/07/2018 12:26
Thallium	ND		0.50	1	08/07/2018 12:26
Vanadium	420		0.50	1	08/07/2018 12:26
Zinc	420		5.0	1	08/07/2018 12:26
<u>Surrogates</u>	<u>REC (%)</u>		<u>Limits</u>		
Terblum	102		70-130		08/07/2018 12:26
<u>Analyst(s)</u> : ND					

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Analytical Report

Client: Fletcher Consultants, Inc.
Date Received: 8/3/18 15:32
Date Prepared: 8/3/18
Project: MCWP Closure Project

WorkOrder: 1808177
Extraction Method: SW3050B
Analytical Method: SW6020
Unit: mg/Kg

Filter cloths from
Filter Press Plates

CAM / CCR 17 Metals + Misc. Elements

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MLS18-138	1808177-003A	Solid	08/02/2018 11:16	ICP-MS1 032SMPL.D	162689
Analytes	Result	RL	DF	Date Analyzed	
Antimony	ND	0.50	1	08/08/2018 18:50	
Arsenic	ND	0.50	1	08/08/2018 18:50	
Barium	6.2	5.0	1	08/08/2018 18:50	
Beryllium	ND	0.50	1	08/08/2018 18:50	
Cadmium	ND	0.25	1	08/08/2018 18:50	
Chromium	4.9	0.50	1	08/08/2018 18:50	
Cobalt	1.0	0.50	1	08/08/2018 18:50	
Copper	47	0.50	1	08/08/2018 18:50	
Iron	3800	20	1	08/08/2018 18:50	
Lead	1.2	0.50	1	08/08/2018 18:50	
Mercury	0.14	0.050	1	08/08/2018 18:50	
Molybdenum	1.3	0.50	1	08/08/2018 18:50	
Nickel	7.3	0.50	1	08/08/2018 18:50	
Selenium	ND	0.50	1	08/08/2018 18:50	
Silver	ND	0.50	1	08/08/2018 18:50	
Thallium	ND	0.50	1	08/08/2018 18:50	
Vanadium	7.4	0.50	1	08/08/2018 18:50	
Zinc	40	5.0	1	08/08/2018 18:50	
Surrogates	REC (%)	Limits		Date Analyzed	
Terbium	83	70-130		08/08/2018 18:50	
Analyst(s): ND					

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Analytical Report

Client: Fletcher Consultants, Inc.
Date Received: 8/3/18 15:32
Date Prepared: 8/3/18
Project: MCWP Closure Project

WorkOrder: 1808177
Extraction Method: SW3050B
Analytical Method: SW6020
Unit: mg/Kg

Solids from
UG + 7 Fiberglass
Tanks

CAM / CCR 17 Metals + Misc. Elements

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MLS18-139	1808177-004A	Solid	08/02/2018 11:30	ICP-MS1 101SMPL.D	162689
Analytes	Result		RL	DE	Date Analyzed
Antimony	ND		10	20	08/07/2018 19:37
Arsenic	22		10	20	08/07/2018 19:37
Barium	ND		100	20	08/07/2018 19:37
Beryllium	ND		10	20	08/07/2018 19:37
Cadmium	ND		5.0	20	08/07/2018 19:37
Chromium	600		10	20	08/07/2018 19:37
Cobalt	22		10	20	08/07/2018 19:37
Copper	570		10	20	08/07/2018 19:37
Iron	580,000		400	20	08/07/2018 19:37
Lead	66		10	20	08/07/2018 19:37
Mercury	ND		1.0	20	08/07/2018 19:37
Molybdenum	60		10	20	08/07/2018 19:37
Nickel	290		10	20	08/07/2018 19:37
Selenium	ND		10	20	08/07/2018 19:37
Silver	ND		10	20	08/07/2018 19:37
Thallium	ND		10	20	08/07/2018 19:37
Vanadium	250		10	20	08/07/2018 19:37
Zinc	ND		100	20	08/07/2018 19:37
Surrogates	REC (%)		Limits		
Terbium	101		70-130		08/07/2018 19:37
Analyst(s): ND			Analytical Comments: a1		

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Analytical Report

Client: Fletcher Consultants, Inc.
Date Received: 8/3/18 15:32
Date Prepared: 8/3/18-8/6/18
Project: MCWP Closure Project

WorkOrder: 1808177
Extraction Method: SW9045C
Analytical Method: SW9045C
Unit: pH units @ 25°C

pH

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MLS18-136	1808177-001A	Solid	08/02/2018 11:00	WetChem	162693

Analytes	Result	Accuracy	DE	Date Analyzed
pH	6.43	±0.1	1	08/03/2018 16:06

Analyst(s): PHU

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MLS18-137	1808177-002A	Solid	08/02/2018 12:00	WetChem	162693

Analytes	Result	Accuracy	DE	Date Analyzed
pH	6.72	±0.1	1	08/03/2018 16:09

Analyst(s): PHU

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MLS18-138	1808177-003A	Solid	08/02/2018 11:15	WetChem	162752

Analytes	Result	Accuracy	DE	Date Analyzed
pH	7.85	±0.1	1	08/06/2018 13:30

Analyst(s): PHU

Analytical Comments: g3

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MLS18-139	1808177-004A	Solid	08/02/2018 11:30	WetChem	162693

Analytes	Result	Accuracy	DE	Date Analyzed
pH	4.03	±0.1	1	08/03/2018 16:12

Analyst(s): PHU



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Analytical Report

Client: Fletcher Consultants, Inc.
Date Received: 8/3/18 15:32
Date Prepared: 8/5/18
Project: MCWP Closure Project

WorkOrder: 1808177
Extraction Method: SW1311/SW3010
Analytical Method: SW6020
Unit: mg/L

Metals (TCLP)

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MLS18-136	1808177-001A	Solid	08/02/2018 11:00	ICP-MS3 087SMPL.D	162719

Analytes	Result	RL	DE	Date Analyzed
Arsenic	ND	0.10	1	08/06/2018 18:22
Barium	ND	1.0	1	08/06/2018 18:22
Cadmium	ND	0.050	1	08/06/2018 18:22
Chromium	ND	0.10	1	08/06/2018 18:22
Lead	ND	0.10	1	08/06/2018 18:22
Mercury	ND	0.010	1	08/06/2018 18:22
Selenium	ND	0.10	1	08/06/2018 18:22
Silver	ND	0.10	1	08/06/2018 18:22

Analyst(s): MIG

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MLS18-137	1808177-002A	Solid	08/02/2018 12:00	ICP-MS3 088SMPL.D	162719

Analytes	Result	RL	DE	Date Analyzed
Arsenic	ND	0.10	1	08/06/2018 18:28
Barium	ND	1.0	1	08/06/2018 18:28
Cadmium	ND	0.050	1	08/06/2018 18:28
Chromium	ND	0.10	1	08/06/2018 18:28
Lead	ND	0.10	1	08/06/2018 18:28
Mercury	ND	0.010	1	08/06/2018 18:28
Selenium	ND	0.10	1	08/06/2018 18:28
Silver	ND	0.10	1	08/06/2018 18:28

Analyst(s): MIG

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Analytical Report

Client: Fletcher Consultants, Inc.
Date Received: 8/3/18 15:32
Date Prepared: 8/5/18
Project: MCWP Closure Project

WorkOrder: 1808177
Extraction Method: SW1311/SW3010
Analytical Method: SW6020
Unit: mg/L

Metals (TCLP)

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MLS18-138	1808177-003A	Solid	08/02/2018 11:15	ICP-MS3 089SMPL.D	162719
Analytes	Result	RL	DF	Date Analyzed	
Arsenic	ND	0.10	1	08/06/2018 18:35	
Barium	ND	1.0	1	08/06/2018 18:35	
Cadmium	ND	0.050	1	08/06/2018 18:35	
Chromium	ND	0.10	1	08/06/2018 18:35	
Lead	ND	0.10	1	08/06/2018 18:35	
Mercury	ND	0.010	1	08/06/2018 18:35	
Selenium	ND	0.10	1	08/06/2018 18:35	
Silver	ND	0.10	1	08/06/2018 18:35	

Analyst(s): MIG

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MLS18-139	1808177-004A	Solid	08/02/2018 11:30	ICP-MS3 090SMPL.D	162719
Analytes	Result	RL	DF	Date Analyzed	
Arsenic	ND	0.10	1	08/06/2018 18:41	
Barium	ND	1.0	1	08/06/2018 18:41	
Cadmium	ND	0.050	1	08/06/2018 18:41	
Chromium	ND	0.10	1	08/06/2018 18:41	
Lead	ND	0.10	1	08/06/2018 18:41	
Mercury	ND	0.010	1	08/06/2018 18:41	
Selenium	ND	0.10	1	08/06/2018 18:41	
Silver	ND	0.10	1	08/06/2018 18:41	

Analyst(s): MIG



Quality Control Report

Client: Fletcher Consultants, Inc.
Date Prepared: 8/4/18
Date Analyzed: 8/6/18
Instrument: ICP-MS3
Matrix: Soil
Project: MCWP Closure Project

WorkOrder: 1808177
BatchID: 162712
Extraction Method: CA Title 22
Analytical Method: SW6020
Unit: mg/L
Sample ID: MB/LCS/LCSD-162712

QC Summary Report for Metals (STLC)

Analyte	MB Result	RL			
Antimony	ND	0.10	-	-	-
Arsenic	ND	0.10	-	-	-
Barium	ND	1.0	-	-	-
Beryllium	ND	0.10	-	-	-
Cadmium	ND	0.050	-	-	-
Chromium	ND	0.10	-	-	-
Cobalt	ND	0.10	-	-	-
Copper	ND	0.10	-	-	-
Lead	ND	0.10	-	-	-
Mercury	ND	0.010	-	-	-
Molybdenum	ND	0.10	-	-	-
Nickel	ND	0.10	-	-	-
Selenium	ND	0.10	-	-	-
Silver	ND	0.10	-	-	-
Thallium	ND	0.10	-	-	-
Vanadium	ND	0.10	-	-	-
Zinc	ND	1.0	-	-	-

(Cont.)

CA ELAP 1644 • NELAP 4033ORELAP



Quality Control Report

Client: Fletcher Consultants, Inc.
Date Prepared: 8/4/18
Date Analyzed: 8/6/18
Instrument: ICP-MS3
Matrix: Soil
Project: MCWP Closure Project

WorkOrder: 1808177
BatchID: 162712
Extraction Method: CA Title 22
Analytical Method: SW6020
Unit: mg/L
Sample ID: MB/LCS/LCSD-162712

QC Summary Report for Metals (STLC)

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
Antimony	10.8	10.8	10	108	108	75-125	0	20
Arsenic	9.97	9.98	10	100	100	75-125	0	20
Barium	102	101	100	102	101	75-125	1.20	20
Beryllium	9.88	9.83	10	99	98	75-125	0.528	20
Cadmium	9.77	9.62	10	98	96	75-125	1.59	20
Chromium	9.64	9.68	10	96	97	75-125	0.414	20
Cobalt	9.57	9.57	10	96	96	75-125	0	20
Copper	9.70	9.69	10	97	97	75-125	0	20
Lead	9.74	9.68	10	97	97	75-125	0	20
Mercury	0.239	0.250	0.25	96	100	75-125	4.50	20
Molybdenum	10.2	10.2	10	102	102	75-125	0	20
Nickel	9.83	9.84	10	98	98	75-125	0	20
Selenium	9.95	9.94	10	100	99	75-125	0.141	20
Silver	10.1	10.0	10	101	100	75-125	0.993	20
Thallium	9.76	9.65	10	98	97	75-125	1.11	20
Vanadium	9.66	9.55	10	97	96	75-125	1.10	20
Zinc	97.8	97.6	100	98	98	75-125	0	20



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Quality Control Report

Client: Fletcher Consultants, Inc.
Date Prepared: 8/3/18
Date Analyzed: 8/6/18
Instrument: ICP-MS1
Matrix: Soil
Project: MCWP Closure Project

WorkOrder: 1808177
BatchID: 162689
Extraction Method: SW3050B
Analytical Method: SW6020
Unit: mg/Kg
Sample ID: MB/LCS/LCSD-162689

QC Summary Report for Metals

Analyte	MB Result	RL	SPK Val	MB SS %REC	MB SS Limits
Antimony	ND	0.50	-	-	-
Arsenic	ND	0.50	-	-	-
Barium	ND	5.0	-	-	-
Beryllium	ND	0.50	-	-	-
Cadmium	ND	0.25	-	-	-
Chromium	ND	0.50	-	-	-
Cobalt	ND	0.50	-	-	-
Copper	ND	0.50	-	-	-
Iron	ND	20	-	-	-
Lead	ND	0.50	-	-	-
Mercury	ND	0.050	-	-	-
Molybdenum	ND	0.50	-	-	-
Nickel	ND	0.50	-	-	-
Selenium	ND	0.50	-	-	-
Silver	ND	0.50	-	-	-
Thallium	ND	0.50	-	-	-
Vanadium	ND	0.50	-	-	-
Zinc	ND	5.0	-	-	-
Surrogate Recovery					
Terbium	521		500	104	70-130

(Cont.)

CA ELAP 1644 • NELAP 40330RELAP



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Quality Control Report

Client: Fletcher Consultants, Inc.
Date Prepared: 8/3/18
Date Analyzed: 8/6/18
Instrument: ICP-MS1
Matrix: Soil
Project: MCWP Closure Project

WorkOrder: 1808177
BatchID: 162689
Extraction Method: SW3050B
Analytical Method: SW6020
Unit: mg/Kg
Sample ID: MB/LCS/LCSD-162689

QC Summary Report for Metals

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
Antimony	53.5	52.2	50	107	104	75-125	2.57	20
Arsenic	51.4	50.7	50	103	101	75-125	1.49	20
Barium	536	522	500	107	104	75-125	2.59	20
Beryllium	52.8	51.2	50	106	102	75-125	2.92	20
Cadmium	51.6	50.2	50	103	100	75-125	2.65	20
Chromium	52.3	51.0	50	105	102	75-125	2.52	20
Cobalt	50.5	49.3	50	101	99	75-125	2.38	20
Copper	51.9	50.9	50	104	102	75-125	1.89	20
Iron	5100	5010	5000	102	100	75-125	1.66	20
Lead	51.6	49.9	50	103	100	75-125	3.21	20
Mercury	1.25	1.25	1.25	100	100	75-125	0	20
Molybdenum	51.8	50.1	50	104	100	75-125	3.33	20
Nickel	52.6	51.0	50	105	102	75-125	3.05	20
Selenium	51.3	50.0	50	103	100	75-125	2.51	20
Silver	53.1	51.4	50	106	103	75-125	3.18	20
Thallium	50.6	48.9	50	101	98	75-125	3.54	20
Vanadium	52.2	50.8	50	104	102	75-125	2.68	20
Zinc	519	508	500	104	102	75-125	2.12	20
Surrogate Recovery								
Terbium	534	521	500	107	104	70-130	2.48	20



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Quality Control Report

Client: Fletcher Consultants, Inc.
Date Prepared: 8/3/18
Date Analyzed: 8/3/18
Instrument: WetChem
Matrix: Soil
Project: MCWP Closure Project

WorkOrder: 1808177
BatchID: 162693
Extraction Method: SW9045C
Analytical Method: SW9045C
Unit: pH units @ 25°C

QC Summary Report for pH

SampleID	Sample Result	Sample DF	Dup / Serial Dilution Result	Dup / Serial Dilution DF	Precision	Acceptance Criteria
1808172-001A	7.43	1	7.41	1	0.02	0.1

Client: Fletcher Consultants, Inc.
Date Prepared: 8/6/18
Date Analyzed: 8/6/18
Instrument: WetChem
Matrix: Soil
Project: MCWP Closure Project

WorkOrder: 1808177
BatchID: 162752
Extraction Method: SW9045C
Analytical Method: SW9045C
Unit: pH units @ 25°C

QC Summary Report for pH

SampleID	Sample Result	Sample DF	Dup / Serial Dilution Result	Dup / Serial Dilution DF	Precision	Acceptance Criteria
1808164-001A	11.41	1	11.41	1	0	0.1



Quality Control Report

Client: Fletcher Consultants, Inc.
Date Prepared: 8/5/18
Date Analyzed: 8/6/18
Instrument: ICP-MS3
Matrix: Soil
Project: MCWP Closure Project

WorkOrder: 1808177
BatchID: 162719
Extraction Method: SW1311/SW3010
Analytical Method: SW6020
Unit: mg/L
Sample ID: MB/LCS/LCSD-162719

QC Summary Report for Metals (TCLP)

Analyte	MB Result	RL			
Arsenic	ND	0.10	-	-	-
Barium	ND	1.0	-	-	-
Cadmium	ND	0.050	-	-	-
Chromium	ND	0.10	-	-	-
Lead	ND	0.10	-	-	-
Mercury	ND	0.010	-	-	-
Selenium	ND	0.10	-	-	-
Silver	ND	0.10	-	-	-

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
Arsenic	9.66	9.63	10	97	96	75-125	0.249	20
Barium	100	98.6	100	100	99	75-125	1.43	20
Cadmium	9.39	9.23	10	94	92	75-125	1.78	20
Chromium	9.23	9.09	10	92	91	75-125	1.53	20
Lead	9.53	9.30	10	95	93	75-125	2.38	20
Mercury	0.233	0.230	0.25	93	92	75-125	1.55	20
Selenium	9.71	9.62	10	97	96	75-125	0.952	20
Silver	9.84	9.77	10	98	98	75-125	0	20

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(925) 252-9262

☐ WaterTrax

☐ WriteOn

☐ EDF

☐ Excel

☐ EQulS

☐ Email

☐ HardCopy

☐ ThirdParty

☐ J-flag

☐ Detection Summary

☐ Dry-Weight

Report to:

Craig R. Fletcher
Fletcher Consultants, Inc.
4858 Harbord Drive
Oakland, CA 94618
(510) 654-3486 FAX: (510) 654-3399

Email: fci2000@sbcglobal.net; craig@fletchercon
cc3rd Party: ernie.blaecher@vistroenergy.com;
PO:
Project: MCWP Closure Project

Bill to:

Craig R. Fletcher
Fletcher Consultants, Inc.
4858 Harbord Drive
Oakland, CA 94618

Requested TAT: 5 days;

Date Received: 08/03/2018

Date Logged: 08/03/2018

CHAIN-OF-CUSTODY RECORD

Page 1 of 1

WorkOrder: 1808177

ClientCode: FC

Lab ID

Client ID

MatrixCo

Rection Date

Hold

Requested Tests (See legend below)

1	2	3	4	5	6	7	8	9	10	11	12
1808177-001	MLS18-136	Solid	8/2/2018 11:00	<input type="checkbox"/>	A	A	A	A			
1808177-002	MLS18-137	Solid	8/2/2018 12:00	<input type="checkbox"/>	A	A	A	A			
1808177-003	MLS18-138	Solid	8/2/2018 11:15	<input type="checkbox"/>	A	A	A	A			
1808177-004	MLS18-139	Solid	8/2/2018 11:30	<input type="checkbox"/>	A	A	A	A			

Test Legend:

1	CAM17MS_STLC_S
5	
9	

2	CAMMETMS TTLC_S
6	
10	

3	PH_S
7	
11	

4	RCRAMS TCLP_S
8	
12	

Prepared by: Agustina Venegas

Comments:

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days).
Hazardous samples will be returned to client or disposed of at client expense.



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WORK ORDER SUMMARY

Client Name: FLETCHER CONSULTANTS, INC.

Project: MCWP Closure Project

Work Order: 1808177

Client Contact: Craig R. Fletcher

QC Level: LEVEL 2

Contact's Email: fci2000@sbcglobal.net;
craig@fletcherconsultantsinc.com

Comments:

Date Logged: 8/3/2018

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ Fax ☐ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Lab ID	Client ID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	De-chlorinated	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1808177-001A	MLS18-136	Solid	SW6020 (RCRA Metals) (TCLP)	1	16OZ GI, Unpres	<input type="checkbox"/>	8/2/2018 11:00	5 days*			<input type="checkbox"/>
			SW9045C (pH)			<input type="checkbox"/>		5 days			<input type="checkbox"/>
			SW6020 (Metals) <Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Mercury, Molybdenum, Nickel, Selenium, Silver, Thallium, Vanadium, Zinc>			<input type="checkbox"/>		5 days			<input type="checkbox"/>
			SW6020 (CAM 17) (STLC)			<input type="checkbox"/>		5 days*			<input type="checkbox"/>
1808177-002A	MLS18-137	Solid	SW6020 (RCRA Metals) (TCLP)	1	16OZ GI, Unpres	<input type="checkbox"/>	8/2/2018 12:00	5 days*			<input type="checkbox"/>
			SW9045C (pH)			<input type="checkbox"/>		5 days			<input type="checkbox"/>
			SW6020 (Metals) <Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Mercury, Molybdenum, Nickel, Selenium, Silver, Thallium, Vanadium, Zinc>			<input type="checkbox"/>		5 days			<input type="checkbox"/>
			SW6020 (CAM 17) (STLC)			<input type="checkbox"/>		5 days*			<input type="checkbox"/>
1808177-003A	MLS18-138	Solid	SW6020 (RCRA Metals) (TCLP)	1	16OZ GI, Unpres	<input type="checkbox"/>	8/2/2018 11:15	5 days*			<input type="checkbox"/>
			SW9045C (pH)			<input type="checkbox"/>		5 days			<input type="checkbox"/>

NOTES: - STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).

- MAI assumes that all material present in the provided sampling container is considered part of the sample - MAI does not exclude any material from the sample prior to sample preparation unless requested in writing by the client.



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WORK ORDER SUMMARY

Client Name: FLETCHER CONSULTANTS, INC.

Project: MCWP Closure Project

Work Order: 1808177

Client Contact: Craig R. Fletcher

QC Level: LEVEL 2

Contact's Email: fci2000@sbcglobal.net;
craig@fletcherconsultantsinc.com

Comments:

Date Logged: 8/3/2018

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ Fax ☐ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Lab ID	Client ID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	De-chlorinated	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1808177-003A	MLS18-138	Solid	SW6020 (Metals) <Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Mercury, Molybdenum, Nickel, Selenium, Silver, Thallium, Vanadium, Zinc> SW6020 (CAM 17) (STLC)	1	16OZ GJ, Unpres	<input type="checkbox"/>	8/2/2018 11:15	5 days		<input type="checkbox"/>	
1808177-004A	MLS18-139	Solid	SW6020 (RCRA Metals) (TCLP) SW9045C (pH) SW6020 (Metals) <Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Mercury, Molybdenum, Nickel, Selenium, Silver, Thallium, Vanadium, Zinc> SW6020 (CAM 17) (STLC)	1	16OZ GJ, Unpres	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	8/2/2018 11:30	5 days* 5 days 5 days 5 days*		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	

NOTES: - STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).

- MAI assumes that all material present in the provided sampling container is considered part of the sample - MAI does not exclude any material from the sample prior to sample preparation unless requested in writing by the client.

1808177

MOSS LANDING POWER PLANT

Post Office Box 690 * Moss Landing, California 95039 * (831) 633-6786

CHAIN OF CUSTODY RECORD

Page 1 of 1

PROJECT NAME: MCWP Closure Project						Analysis Required						Remarks			
SAMPLERS (signature)						ANALYSIS									
ERNE CLEACHER						TELEPHONE (831) 633-6786									
SAMPLE LOCATION	DATE SAMPLED	TIME SAMPLED	COMP	GRAB	SAMPLE NUMBER AND DESCRIPTION	No. of containers	Volume Quantity (L)	TEL. MEMO (831) 633-6786	THICK. 22 WET	THICK. 22 DRY	TEL. CAM. 17	TEL. CAM. 17	IRON	PH	
MCWP #192	8/2/18	1100		X	MLS1B-136	1	500	X	X	X	X	X	X		
2-55 drums of solids															
from MCWP #192 Filter Housing															
MCWP #3	8/2/18	1200		X	MLS1B-137	1	500	X	X	X	X	X	X		
1-55 drum of solids															
from Filter Housing MCWP #3															
Harford	8/2/18	1115		X	MLS1B-138	1		X	X	X	X	X	X		
3-55 solid drums of Filter Housing from old Filter Press															
MLS1B-139						1		X	X	X	X	X	X		
Harford	8/3/18	1130		X	4-55 solid drums of solid from										
MCWP Samps of #697 (white fiber loss tail's)															
Signature						Print Name						Company		Date	Time
Relinquished by						RICHARD CARRILLO						DUPONT		8/2/18	1515
Received by						KATE R. FLETCHER						ECL		8/2/18	1515
Relinquished by						KATE R. FLETCHER						F.I.		8/3/18	1532
Received by						JENA ALPHEO						MAI		8/3/18	1532
Relinquished by															
Received by Laboratory															

Samples going to: 2:00 AM

Insert contract information's name, address, and telephone before making any of shipping

5772521202

McCombs Analytical
1934 Willow Way
Pittsburg CA 94565

→ BILL TO FLEXTRON CONSULTING, INC. Page 24 of 25



Sample Receipt Checklist

Client Name: **Fletcher Consultants, Inc.**
Project: **MCWP Closure Project**

Date and Time Received: **8/3/2018 15:32**
Date Logged: **8/3/2018**
Received by: **Jena Alfaro**
Logged by: **Agustina Venegas**

WorkOrder No: **1808177** Matrix: **Solid**
Carrier: **Client Drop-In**

Chain of Custody (COC) Information

Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample IDs noted by Client on COC?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Date and Time of collection noted by Client on COC?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sampler's name noted on COC?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
COC agrees with Quote?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	NA <input checked="" type="checkbox"/>

Sample Receipt Information

Custody seals intact on shipping container/cooler?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	NA <input checked="" type="checkbox"/>
Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper containers/bottles?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	

Sample Preservation and Hold Time (HT) Information

All samples received within holding time?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	NA <input type="checkbox"/>
Samples Received on Ice?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	

(Ice Type: WET ICE)

Sample/Temp Blank temperature	Temp: 2°C	NA <input type="checkbox"/>
Water - VOA vials have zero headspace / no bubbles?	Yes <input type="checkbox"/> No <input type="checkbox"/>	NA <input checked="" type="checkbox"/>
Sample labels checked for correct preservation?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
pH acceptable upon receipt (Metal: <2; 522: <4; 218.7: >8)?	Yes <input type="checkbox"/> No <input type="checkbox"/>	NA <input checked="" type="checkbox"/>

UCMR Samples:

pH tested and acceptable upon receipt (200.8: ≤2; 525.3: ≤4; 530: ≤7; 541: <3; 544: <6.5 & 7.5)?	Yes <input type="checkbox"/> No <input type="checkbox"/>	NA <input checked="" type="checkbox"/>
--	--	--

Free Chlorine tested and acceptable upon receipt (<0.1mg/L)?	Yes <input type="checkbox"/> No <input type="checkbox"/>	NA <input checked="" type="checkbox"/>
--	--	--

Comments:

DYNEGY MOSS LANDING, L.L.C

Moss Landing Power Plant
PO BOX 690
MOSS LANDING CA 95039
831-633-6700

**CERTIFIED MAIL # 7018 1830 0000 8332 3100
RETURN RECEIPT**

January 23, 2019

Mr. Gary Hammond
Department of Toxic Substances Control,
Permitting Division
8800 Cal Center Drive
Sacramento, CA 95826-3200

Mr. John M. Robertson, Executive Officer
California Central Coast Regional Water
Quality Control Board
895 Aerovista Place, Suite 101
San Luis Obispo, CA 93401

Attention: Ms. Sarah Treadwell:

**Re: Dynegy Moss Landing, LLC Fourth Quarter and Annual 2018,
Groundwater Monitoring Report for the Class I Surface Impoundment's**

Dear Messrs. Hammond and Robertson:

The Fourth Quarter and Annual 2018 Groundwater Monitoring Reports for the Class I Surface Impoundment's for Dynegy Moss Landing, LLC is enclosed. This report presents analytical results from samples collected on October 16 and 17, 2018.

This report is implemented in accordance with the following:

1. The Groundwater Monitoring Plan-MLPP, Revision 14 (March 2017), approved by the California Environmental Protection Agency (EPA), Department of Toxic Substances Control.
2. Hazardous Waste Permit, EPA ID No. CAT080011653, issued by the California EPA, Department of Toxic Substances Control on September 14, 2017.
3. Waste Discharge Requirements, Order No. R3-2014-0029 issued by the California Regional Water Quality Control Board, Central Coast Region, on July 31, 2014.

The annual reporting information is also included in this report in accordance with the permits referenced above; the Groundwater Monitoring Plan, and the California Code of Regulations, Title 22, 66264.97(e)(14), (15) and (16).

Attachment No. 1 is Dynegy Moss Landing, LLC groundwater monitoring schedule for 2019.

Attachment No. 2 is the chemical analysis of filtered waste water through 5 micron filters from the three Surface Impoundments for Closure activity of flushing piping decontamination to the Impoundments. This is the last time any waste will be processed from the Surface Impoundments.

Per the DTSC request, a hard and electronic copy is enclosed.

Per the CCRWQCB request, an electronic copy has been down loaded to GeoTracker.

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 be 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 or require additional information, please contact Ernie Bloecher, of my staff, at (831) 633-6786.

Sincerely,



KENT NELSON
Managing Director
Moss Landing and Oakland Power Plants

ECBloecher
Enclosure:

Attachment 1

Dynegy Moss Landing, LLC

**RCRA Part B Permit
For
Surface Impoundments at Moss Landing Power Plant**

Groundwater Monitoring Schedule for 2019

Monitoring will occur on the following days during 2019, in accordance with the Groundwater Monitoring Plan-MLPP, Revision 14 (March 2017)

January 15, 2019	0630-1800
January 16, 2019	0630-1800
April 16, 2019	0630-1800
April 17, 2019	0630-1800
July 16, 2019	0630-1800
July 17, 2019	0630-1800
October 15, 2019	0630-1800
October 16, 2019	0630-1800

Each monitoring event is two days, using one sampler and truck.

Please contact Ernie Bloecher at (831) 633-6786 for more information or questions.