

# JM Eagle

- THE LEADER IN PIPE INNOVATION
- THE HIGHEST LEVEL OF QUALITY
- THE LARGEST BREADTH OF PRODUCT
- THE WIDEST CAPACITY
- EXPRESS DELIVERY



## PLANT LOCATIONS

Revised March 2011

JME-07A

© J-M Manufacturing Co., Inc.



*Building essentials  
for a better tomorrow™*

### GLOBAL HEADQUARTERS:

5200 West Century Blvd  
Los Angeles, CA 90045  
T: 800.621.4404  
F: 800.451.4170

[www.JMEagle.com](http://www.JMEagle.com)

### REGIONAL OFFICE:

Nine Peach Tree Hill Road  
Livingston, NJ 07039  
T: 973.535.1633  
F: 973.533.4185



Appendix C  
Design Calculations

This page intentionally left blank

---

Appendix C1  
Chemical Systems

This page intentionally left blank

**CAMBRIA DESALTING FACILITY**  
**Chemical Systems**

ECY 7/3/2014

input
output

Chemical	Aqueous Ammonia	Sodium Hypochlorite	Sodium Hypochlorite	Sulfuric Acid	Threshold Inhibitor	Threshold Inhibitor	Hydrogen Peroxide	Calcium Chloride	Sodium Hydroxide
	A	B	F	C	D	D	E	G	H
Process Stream	Raw Water	Raw Water	Product Water	RO Feed	RO Train 1 Feed	RO Train 2 Feed	UV Feed	Post-Treatment	Post-Treatment
Flow, Avg.	691 gpm	691 gpm	484 gpm	529 gpm	265 gpm	265 gpm	487 gpm	487 gpm	487 gpm
Flow, Avg.	1.0 mgd	1.0 mgd	0.7 mgd	0.8 mgd	0.4 mgd	0.4 mgd	0.7 mgd	0.7 mgd	0.7 mgd
Concentration	19.00%	12.50%	12.50%	93.00%	100.00%	100.00%	25.00%	32.00%	25.00%
Form	Liquid	Liquid	Liquid	Liquid	Liquid	Liquid	Liquid	Liquid	Liquid
S.G.	0.920	1.220	1.220	1.780	1.250	1.250	1.100	1.350	1.252
Density	7.67 lb/gal	10.18 lb/gal	10.18 lb/gal	14.85 lb/gal	10.43 lb/gal	10.43 lb/gal	9.18 lb/gal	11.26 lb/gal	10.44 lb/gal
Dose, Min.	0.5 mg/L	2.0 mg/L	13.0 mg/L	30.0 mg/L	1.0 mg/L	1.0 mg/L	2.0 mg/L	20.0 mg/L	20.0 mg/L
Dose, Avg.	1.0 mg/L	4.0 mg/L	15.0 mg/L	30.0 mg/L	2.0 mg/L	2.0 mg/L	3.0 mg/L	30.0 mg/L	33.0 mg/L
Dose, Max.	1.5 mg/L	6.0 mg/L	19.0 mg/L	45.0 mg/L	3.0 mg/L	3.0 mg/L	5.0 mg/L	40.0 mg/L	50.0 mg/L
Lb Active Feed @ Avg Flow, Min Dose	4 ppd	17 ppd	76 ppd	191 ppd	3 ppd	3 ppd	12 ppd	117 ppd	117 ppd
Lb Active Feed @ Avg Flow, Avg Dose	8 ppd	33 ppd	87 ppd	191 ppd	6 ppd	6 ppd	18 ppd	176 ppd	193 ppd
Lb Active Feed @ Avg Flow, Max Dose	12 ppd	50 ppd	110 ppd	286 ppd	10 ppd	10 ppd	29 ppd	234 ppd	293 ppd
Feed Rate @ Avg Flow, Min Dose	2.8 gpd	13 gpd	59 gpd	13.8 gpd	0.3 gpd	0.3 gpd	5.1 gpd	32 gpd	45 gpd
Feed Rate @ Avg Flow, Avg Dose	5.7 gpd	26 gpd	69 gpd	13.8 gpd	0.6 gpd	0.6 gpd	7.7 gpd	49 gpd	74 gpd
Feed Rate @ Avg Flow, Max Dose	8.5 gpd	39 gpd	87 gpd	20.7 gpd	0.9 gpd	0.9 gpd	12.8 gpd	65 gpd	112 gpd
Required Pump Capacity	0.40 gph	1.8 gph	4.0 gph	0.96 gph	0.04 gph	0.04 gph	0.59 gph	3.0 gph	5.2 gph
<b>Design Pump Capacity</b>	<b>0.40 gph</b>	<b>1.8 gph</b>	<b>4.0 gph</b>	<b>1.00 gph</b>	<b>0.05 gph</b>	<b>0.05 gph</b>	<b>0.60 gph</b>	<b>3.0 gph</b>	<b>5.2 gph</b>
Pipe Diameter	0.25 inch	0.25 inch	0.25 inch	0.25 inch	0.25 inch	0.25 inch	0.25 inch	0.25 inch	0.25 inch
Pipe Area	0.049 si	0.049 si	0.049 si	0.049 si	0.049 si	0.049 si	0.049 si	0.049 si	0.049 si
Pipe Area	0.0003 sf	0.0003 sf	0.0003 sf	0.0003 sf	0.0003 sf	0.0003 sf	0.0003 sf	0.0003 sf	0.0003 sf
Velocity, Min.	0.01 fps	0.06 fps	0.27 fps	0.06 fps	0.00 fps	0.00 fps	0.02 fps	0.15 fps	0.20 fps
Velocity, Avg.	0.03 fps	0.12 fps	0.31 fps	0.06 fps	0.00 fps	0.00 fps	0.03 fps	0.22 fps	0.34 fps
Velocity, Max.	0.04 fps	0.18 fps	0.39 fps	0.09 fps	0.00 fps	0.00 fps	0.06 fps	0.29 fps	0.51 fps
Required Days of Storage	15 days	15 days	15 days	15 days	15 days	15 days	15 days	15 days	15 days
Bulk Storage for Avg Flow & Avg Dose	85 gal	1,420 gal	207 gal	9 gal	9 gal	115 gal	731 gal	1,109 gal	
Bulk Storage for Avg Flow & Max Dose	128 gal	1,890 gal	311 gal	14 gal	14 gal	191 gal	974 gal	1,680 gal	
Required Storage	90 gal	1,420 gal	210 gal	10 gal	10 gal	110 gal	730 gal	1,110 gal	
<b>Design Bulk Storage Tank Volume</b>	<b>405 gal</b>	<b>1,550 gal</b>	<b>405 gal</b>	<b>50 gal</b>	<b>50 gal</b>	<b>405 gal</b>	<b>750 gal</b>	<b>1,000 gal</b>	
Days of Storage at Avg Flow & Avg Dose	71 days	16 days	29 days	82 days	82 days	53 days	15 days	14 days	
Days of Storage at Avg Flow & Max Dose	47 days	12 days	20 days	55 days	55 days	32 days	12 days	9 days	

Project: **Cambria Emergency Water Supply Project**  
 Title: **Post-Treatment Chlorine Dosing**

Date: **6/25/2014**  
 Calc By: **HH**

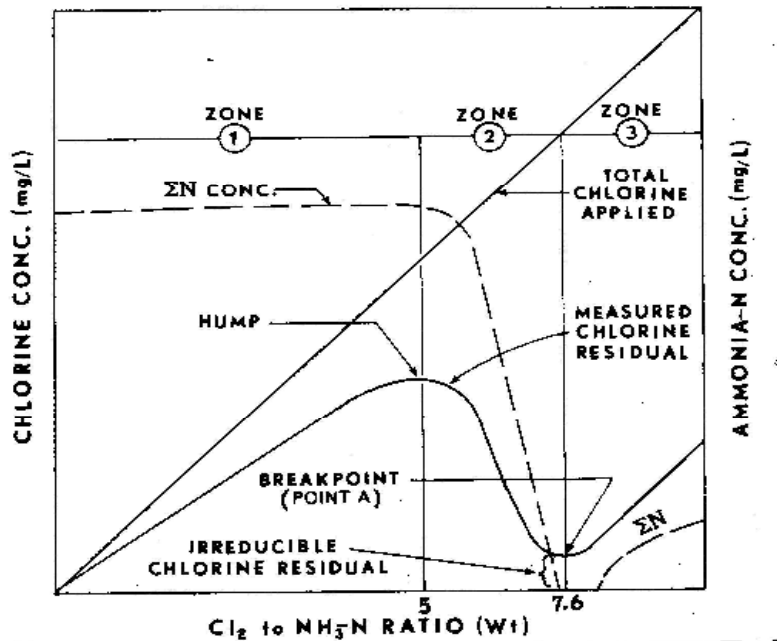
**Purpose:** Determine required post-treatment chlorine dose to obtain 1 mg/L free chlorine residual per CDPH requirement.

**Assumptions:**

WWTP Effluent NH3-N, Average =	1.7 mg/L
RO Permeate NH3-N, Maximum =	0.50 mg/L
RO Permeate NH3-N, Average =	0.25 mg/L
Chloramines, Maximum =	4.0 mg/L
Chloramines, Average =	3.0 mg/L
Peroximide, Maximum =	3.0 mg/L
Peroximide, Average =	2.0 mg/L
Chlorine Demand =	0.0 mg/L
Required Cl2 Residual =	1.0 mg/L

**Equations:**

Cl2:NH3-N Ratio for Breakpoint Chlorination =	7.6
Cl2:Chloramines Ratio for Breakpoint Chlorination =	2.6
Cl2:H2O2 Ratio for Breakpoint Chlorination =	<b>2.1</b> (Watts et al, AWWA 2012)



**Calculation:**

<b>Maximum Dose</b>	
Cl2 required for breakpoint chlorination of NH3-N =	3.80 mg/L
Cl2 required for breakpoint chlorination Chloramines =	10.40 mg/L
Cl2 required for H2O2 quenching =	6.26 mg/L
Cl2 residual =	1.00 mg/L
<b>Maximum Cl2 Dose =</b>	<b>21.5 mg/L</b>

<b>Average Dose</b>	
Cl2 required for breakpoint chlorination of NH3-N =	1.90 mg/L
Cl2 required for breakpoint chlorination Chloramines =	7.80 mg/L
Cl2 required for H2O2 quenching =	4.17 mg/L
Cl2 residual =	1.00 mg/L
<b>Average Cl2 Dose =</b>	<b>14.9 mg/L</b>



---

# Appendix C2

## Hydraulic Calculations

This page intentionally left blank



Client: Cambria  
 Project: Desalination Facility  
 Detail: AWTP Feed Water Pipeline

Job No.  
 Checked By:  
 Dated Checked:

Computed By: E. You  
 Date: 6/11/2014  
 Page No. 1

**Design Criteria**

	Flow	Pipe Diameter
AWTP Feed =	691 gpm	8 in
AWTP Feed =	1.54 cfs	0.67 ft

**Assumptions:**  
 Well 9P7 Grade Elevation = 18.0 ft  
 AWTP Grade Elevation = 23.0 ft  
 Influent Tank Water Level = 8.67 ft

**Friction Losses through Pipe Runs**

Hazen Williams equation:  
 $h_f = 3.022 * v^{1.85} * L / C^{1.85} * D^{1.165}$   
 C = 150 for PVC pipes

**Minor Losses through Fittings**

Type	k	Description	$h_f = kV^2/2g$
BFV	0.50	From CDM Guidelines. (k=0.3-1)	
pipe entrance	0.50	From CDM Guidelines.	
pipe exit	1.00	From CDM Guidelines.	
45°	0.28	From CDM Guidelines.	
30°	0.17	From CDM Guidelines.	
90°	0.32	From CDM Guidelines.	
Reducer		Hm = 0.5*dHv	
Increaser		Hm = 1*dHv	
Cross (Line Flow)	0.50	From Pumping Station Design, App. B	
Tee (Run of Main)	0.60		
Tee (B to M)	1.50	Plug Valve (Lube)	1.00
Tee (M to B)	1.80	Gate Valve	0.10
Wye (Run of Main)	0.60	Butterfly Valve	0.40
Wye (B to M)	1.00	Check Valve (Swing)	2.50
Wye (M to B)	1.20		

Fitting Type	L (ft)	k	% Flow	Q (cfs)	D (in)	D (ft)	For reducers and increasers		Type	dHv	A(ft <sup>2</sup> )	V (fps)	V <sup>2</sup> /2g	H (ft)	HGL (ft)	Notes
							U/S D (ft)	D/S D (ft)								
<b>Well Pump 9P7</b>															<b>9.3 psi</b>	<b>Required Discharge</b>
															<b>21.5 ft</b>	<b>Pressure at Well 9P7</b>
Entrance		0.50	100	1.5	8.00	0.67			0	0.00	0.349	4.41	0.30	0.151	39.51	
Check Valve		2.50	100	1.5	8.00	0.67			0	0.00	0.349	4.41	0.30	0.755	39.36	
Butterfly Valve		0.40	100	1.5	8.00	0.67			0	0.00	0.349	4.41	0.30	0.121	38.60	
Piping	98		100	1.5	8.00	0.67			0	0.00	0.349	4.41	0.30	0.697	38.48	
90° Elbow		0.32	100	1.5	8.00	0.67			0	0.00	0.349	4.41	0.30	0.097	37.79	
Piping	72		100	1.5	8.00	0.67			0	0.00	0.349	4.41	0.30	0.512	37.69	
90° Elbow		0.32	100	1.5	8.00	0.67			0	0.00	0.349	4.41	0.30	0.097	37.18	
Piping	62		100	1.5	8.00	0.67			0	0.00	0.349	4.41	0.30	0.441	37.08	
90° Elbow		0.32	100	1.5	8.00	0.67			0	0.00	0.349	4.41	0.30	0.097	36.64	
Piping	87		100	1.5	8.00	0.67			0	0.00	0.349	4.41	0.30	0.619	36.54	
90° Elbow		0.32	100	1.5	8.00	0.67			0	0.00	0.349	4.41	0.30	0.097	35.92	
Piping	47		100	1.5	8.00	0.67			0	0.00	0.349	4.41	0.30	0.334	35.83	
90° Elbow		0.32	100	1.5	8.00	0.67			0	0.00	0.349	4.41	0.30	0.097	35.49	
Piping	99		100	1.5	8.00	0.67			0	0.00	0.349	4.41	0.30	0.704	35.40	
90° Elbow		0.32	100	1.5	8.00	0.67			0	0.00	0.349	4.41	0.30	0.097	34.69	
Piping	187		100	1.5	8.00	0.67			0	0.00	0.349	4.41	0.30	1.330	34.60	
90° Elbow		0.32	100	1.5	8.00	0.67			0	0.00	0.349	4.41	0.30	0.097	33.27	
Piping	103		100	1.5	8.00	0.67			0	0.00	0.349	4.41	0.30	0.733	33.17	
90° Elbow		0.32	100	1.5	8.00	0.67			0	0.00	0.349	4.41	0.30	0.097	32.44	
Piping	25		100	1.5	8.00	0.67			0	0.00	0.349	4.41	0.30	0.178	32.34	
90° Elbow		0.32	100	1.5	8.00	0.67			0	0.00	0.349	4.41	0.30	0.097	32.16	
90° Elbow		0.32	100	1.5	8.00	0.67			0	0.00	0.349	4.41	0.30	0.097	32.07	
Exit		1.00	100	1.5	8.00	0.67			0	0.00	0.349	4.41	0.30	0.302	31.97	
<b>Total:</b>	<b>780</b>													<b>7.843</b>	<b>31.67 ft</b>	<b>HWL at Influent Tank</b>



Client: Cambria  
 Project: Desalination Facility  
 Detail: AWTP Product Water Pipeline

Job No.  
 Checked By:  
 Dated Checked:

Computed By: E. You  
 Date: 6/11/2014  
 Page No. 1

**Design Criteria**

	Flow	Pipe Diameter
AWTP Product =	484 gpm	8 in
AWTP Product =	1.08 cfs	0.67 ft

**Assumptions:**  
 AWTP Grade Elevation = 23.0 ft  
 RIW Well Site Grade Elevation = 25.0 ft  
 Required Pressure at RIW = 57.8 ft

**Friction Losses through Pipe Runs**

Hazen Williams equation:  
 $h_f = 3.022 * v^{1.85} * L / C^{1.85} * D^{1.165}$   
 C = 150 for PVC pipes

**Minor Losses through Fittings**

Type	k	Description	$h_f = kV^2/2g$
BFV	0.50	From CDM Guidelines. (k=0.3-1)	
pipe entrance	0.50	From CDM Guidelines.	
pipe exit	1.00	From CDM Guidelines.	
45°	0.28	From CDM Guidelines.	
30°	0.17	From CDM Guidelines.	
90°	0.32	From CDM Guidelines.	
Reducer		Hm = 0.5*dHv	
Increaser		Hm = 1*dHv	
Cross (Line Flow)	0.50	From Pumping Station Design, App. B	
Tee (Run of Main)	0.60		
Tee (B to M)	1.50	Plug Valve (Lube)	1.00
Tee (M to B)	1.80	Gate Valve	0.10
Wye (Run of Main)	0.60	Butterfly Valve	0.40
Wye (B to M)	1.00	Check Valve (Swing)	2.50
Wye (M to B)	1.20		

Fitting Type	L (ft)	k	% Flow	Q (cfs)	D (in)	D (ft)	For reducers and increasers		Type	dHv	A(ft <sup>2</sup> )	V (fps)	V <sup>2</sup> /2g	H (ft)	HGL (ft)	Notes
							U/S D (ft)	D/S D (ft)								
<b>AWTP Product Water Pump</b>															<b>32 psi</b>	<b>Required Discharge</b>
															<b>73.6 ft</b>	<b>Pressure at Product</b>
																<b>Water Pump</b>
Entrance		0.50	100	1.1	8.00	0.67			0	0.00	0.349	3.09	0.15	0.074	96.62	
Check Valve		2.50	100	1.1	8.00	0.67			0	0.00	0.349	3.09	0.15	0.370	96.55	
Butterfly Valve		0.40	100	1.1	8.00	0.67			0	0.00	0.349	3.09	0.15	0.059	96.18	
Piping	18		100	1.1	8.00	0.67			0	0.00	0.349	3.09	0.15	0.066	96.12	
90° Elbow		0.32	100	1.1	8.00	0.67			0	0.00	0.349	3.09	0.15	0.047	96.05	
Piping	391		100	1.1	8.00	0.67			0	0.00	0.349	3.09	0.15	1.439	96.01	
90° Elbow		0.32	100	1.1	8.00	0.67			0	0.00	0.349	3.09	0.15	0.047	94.57	
Piping	47		100	1.1	8.00	0.67			0	0.00	0.349	3.09	0.15	0.173	94.52	
90° Elbow		0.32	100	1.1	8.00	0.67			0	0.00	0.349	3.09	0.15	0.047	94.35	
Piping	209		100	1.1	8.00	0.67			0	0.00	0.349	3.09	0.15	0.769	94.30	
90° Elbow		0.32	100	1.1	8.00	0.67			0	0.00	0.349	3.09	0.15	0.047	93.53	
Piping	75		100	1.1	8.00	0.67			0	0.00	0.349	3.09	0.15	0.276	93.48	
90° Elbow		0.32	100	1.1	8.00	0.67			0	0.00	0.349	3.09	0.15	0.047	93.21	
Piping	163		100	1.1	8.00	0.67			0	0.00	0.349	3.09	0.15	0.600	93.16	
90° Elbow		0.32	100	1.1	8.00	0.67			0	0.00	0.349	3.09	0.15	0.047	92.56	
Piping	82		100	1.1	8.00	0.67			0	0.00	0.349	3.09	0.15	0.302	92.51	
90° Elbow		0.32	100	1.1	8.00	0.67			0	0.00	0.349	3.09	0.15	0.047	92.21	
Piping	70		100	1.1	8.00	0.67			0	0.00	0.349	3.09	0.15	0.258	92.16	
90° Elbow		0.32	100	1.1	8.00	0.67			0	0.00	0.349	3.09	0.15	0.047	91.90	
Piping	142		100	1.1	8.00	0.67			0	0.00	0.349	3.09	0.15	0.523	91.86	
90° Elbow		0.32	100	1.1	8.00	0.67			0	0.00	0.349	3.09	0.15	0.047	91.33	
Piping	206		100	1.1	8.00	0.67			0	0.00	0.349	3.09	0.15	0.758	91.29	
90° Elbow		0.32	100	1.1	8.00	0.67			0	0.00	0.349	3.09	0.15	0.047	90.53	
Piping	952		100	1.1	8.00	0.67			0	0.00	0.349	3.09	0.15	3.504	90.48	
90° Elbow		0.32	100	1.1	8.00	0.67			0	0.00	0.349	3.09	0.15	0.047	86.98	
Piping	537		100	1.1	8.00	0.67			0	0.00	0.349	3.09	0.15	1.976	86.93	
90° Elbow		0.32	100	1.1	8.00	0.67			0	0.00	0.349	3.09	0.15	0.047	84.95	
Piping	116		100	1.1	8.00	0.67			0	0.00	0.349	3.09	0.15	0.427	84.91	
90° Elbow		0.32	100	1.1	8.00	0.67			0	0.00	0.349	3.09	0.15	0.047	84.48	
Piping	167		100	1.1	8.00	0.67			0	0.00	0.349	3.09	0.15	0.615	84.43	
90° Elbow		0.32	100	1.1	8.00	0.67			0	0.00	0.349	3.09	0.15	0.047	83.82	
Piping	224		100	1.1	8.00	0.67			0	0.00	0.349	3.09	0.15	0.824	83.77	
90° Elbow		0.32	100	1.1	8.00	0.67			0	0.00	0.349	3.09	0.15	0.047	82.95	
Exit		1.00	100	1.1	8.00	0.67			0	0.00	0.349	3.09	0.15	0.148	82.90	
<b>Total:</b>	<b>3399</b>												<b>13.873</b>	<b>83 ft</b>	<b>Recharge Injection Well (RIW)</b>	



Client: Cambria  
 Project: Desalination Facility  
 Detail: RO Brine Pipeline

Job No.  
 Checked By:  
 Dated Checked:

Computed By: E. You  
 Date: 6/11/2014  
 Page No. 1

**Design Criteria**

	Flow	Pipe Diameter
UF Filtrate =	42 gpm	4 in
UF Filtrate =	0.09 cfs	0.33 ft

**Assumptions:**  
 AWTP Grade Elevation = 23.0 ft  
 Evaporation Pond Top of Berm Elevation = 47.0 ft  
 Evaporation Pond HWL Elevation = 43.2 ft

**Friction Losses through Pipe Runs**

Hazen Williams equation:  
 $h_f = 3.022 * v^{1.85} * L / C^{1.85} * D^{1.165}$   
 C = 150 for PVC pipes

**Minor Losses through Fittings**

Type	k	Description	$h_f = kV^2/2g$
BFV	0.50	From CDM Guidelines. (k=0.3-1)	
pipe entrance	0.50	From CDM Guidelines.	
pipe exit	1.00	From CDM Guidelines.	
45°	0.28	From CDM Guidelines.	
30°	0.17	From CDM Guidelines.	
90°	0.32	From CDM Guidelines.	
Reducer		Hm = 0.5*dHv	
Increaser		Hm = 1*dHv	
Cross (Line Flow)	0.50	From Pumping Station Design, App. B	
Tee (Run of Main)	0.60		
Tee (B to M)	1.50	Plug Valve (Lube)	1.00
Tee (M to B)	1.80	Gate Valve	0.10
Wye (Run of Main)	0.60	Butterfly Valve	0.40
Wye (B to M)	1.00	Check Valve (Swing)	2.50
Wye (M to B)	1.20		

Fitting Type	L (ft)	k	% Flow	Q (cfs)	D (in)	D (ft)	For reducers and increasers		Type	dHv	A(ft <sup>2</sup> )	V (fps)	V <sup>2</sup> /2g	H (ft)	HGL (ft)	Notes
							U/S D (ft)	D/S D (ft)								
<b>RO Concentrate</b>															<b>Required Discharge</b>	
															<b>12 psi</b>	
															<b>26.9 ft</b>	
															<b>Pressure at RO Concentrate</b>	
Entrance		0.50	100	0.1	4.00	0.33			0	0.00	0.087	1.07	0.02	0.009	49.89	
Check Valve		2.50	100	0.1	4.00	0.33			0	0.00	0.087	1.07	0.02	0.045	49.88	
Butterfly Valve		0.40	100	0.1	4.00	0.33			0	0.00	0.087	1.07	0.02	0.007	49.84	
Piping	36		100	0.1	4.00	0.33			0	0.00	0.087	1.07	0.02	0.042	49.83	
90° Elbow		0.32	100	0.1	4.00	0.33			0	0.00	0.087	1.07	0.02	0.006	49.79	
Piping	423		100	0.1	4.00	0.33			0	0.00	0.087	1.07	0.02	0.493	49.78	
90° Elbow		0.32	100	0.1	4.00	0.33			0	0.00	0.087	1.07	0.02	0.006	49.29	
Piping	59		100	0.1	4.00	0.33			0	0.00	0.087	1.07	0.02	0.069	49.28	
90° Elbow		0.32	100	0.1	4.00	0.33			0	0.00	0.087	1.07	0.02	0.006	49.22	
Piping	222		100	0.1	4.00	0.33			0	0.00	0.087	1.07	0.02	0.259	49.21	
90° Elbow		0.32	100	0.1	4.00	0.33			0	0.00	0.087	1.07	0.02	0.006	48.95	
Piping	75		100	0.1	4.00	0.33			0	0.00	0.087	1.07	0.02	0.087	48.95	
90° Elbow		0.32	100	0.1	4.00	0.33			0	0.00	0.087	1.07	0.02	0.006	48.86	
Piping	167		100	0.1	4.00	0.33			0	0.00	0.087	1.07	0.02	0.195	48.85	
90° Elbow		0.32	100	0.1	4.00	0.33			0	0.00	0.087	1.07	0.02	0.006	48.66	
Piping	73		100	0.1	4.00	0.33			0	0.00	0.087	1.07	0.02	0.085	48.65	
90° Elbow		0.32	100	0.1	4.00	0.33			0	0.00	0.087	1.07	0.02	0.006	48.57	
Piping	62		100	0.1	4.00	0.33			0	0.00	0.087	1.07	0.02	0.072	48.56	
90° Elbow		0.32	100	0.1	4.00	0.33			0	0.00	0.087	1.07	0.02	0.006	48.49	
Piping	43		100	0.1	4.00	0.33			0	0.00	0.087	1.07	0.02	0.050	48.48	
90° Elbow		0.32	100	0.1	4.00	0.33			0	0.00	0.087	1.07	0.02	0.006	48.43	
Piping	141		100	0.1	4.00	0.33			0	0.00	0.087	1.07	0.02	0.164	48.43	
90° Elbow		0.32	100	0.1	4.00	0.33			0	0.00	0.087	1.07	0.02	0.006	48.26	
Piping	155		100	0.1	4.00	0.33			0	0.00	0.087	1.07	0.02	0.181	48.26	
90° Elbow		0.32	100	0.1	4.00	0.33			0	0.00	0.087	1.07	0.02	0.006	48.08	
Piping	109		100	0.1	4.00	0.33			0	0.00	0.087	1.07	0.02	0.127	48.07	
90° Elbow		0.32	100	0.1	4.00	0.33			0	0.00	0.087	1.07	0.02	0.006	47.94	
Piping	652		100	0.1	4.00	0.33			0	0.00	0.087	1.07	0.02	0.760	47.94	
90° Elbow		0.32	100	0.1	4.00	0.33			0	0.00	0.087	1.07	0.02	0.006	47.18	
Piping	133		100	0.1	4.00	0.33			0	0.00	0.087	1.07	0.02	0.155	47.17	
Exit		1.00	100	0.1	4.00	0.33			0	0.00	0.087	1.07	0.02	0.018	47.02	
<b>Total:</b>	<b>2350</b>													<b>2.891</b>	<b>47 ft</b>	<b>Brine Evaporation Pond</b>



Client: Cambria  
 Project: Desalination Facility  
 Detail: UF Filtrate Water Pipeline

Job No.  
 Checked By:  
 Dated Checked:

Computed By: E. You  
 Date: 6/26/2014  
 Page No. 1

**Design Criteria**

	Flow	Pipe Diameter
UF Filtrate =	100 gpm	4 in
UF Filtrate =	0.22 cfs	0.33 ft

**Assumptions:**  
 AWTP Grade Elevation = 23.0 ft  
 Break Tank Max Water Surface Elevation = 35.5 ft  
 Discharge Location Grade Elevation = 20.0 ft  
 Required Pressure at Discharge = 0.0 ft

**Friction Losses through Pipe Runs**

<b>Hazen Williams equation:</b>	
$h_f =$	$3.022 * v^{1.85} * L / C^{1.85} * D^{1.165}$
C =	150 for PVC pipes

**Minor Losses through Fittings**

Type	k	Description	$h_f = kV^2/2g$
BFV	0.50	From CDM Guidelines. (k=0.3-1)	
pipe entrance	0.50	From CDM Guidelines.	
pipe exit	1.00	From CDM Guidelines.	
45°	0.28	From CDM Guidelines.	
30°	0.17	From CDM Guidelines.	
90°	0.32	From CDM Guidelines.	
Reducer		Hm = 0.5*dHv	
Increaser		Hm = 1*dHv	
Cross (Line Flow)	0.50	From Pumping Station Design, App. B	
Tee (Run of Main)	0.60		
Tee (B to M)	1.50	Plug Valve (Lube)	1.00
Tee (M to B)	1.80	Gate Valve	0.10
Wye (Run of Main)	0.60	Butterfly Valve	0.40
Wye (B to M)	1.00	Check Valve (Swing)	2.50
Wye (M to B)	1.20		

Fitting Type	L (ft)	k	% Flow	Q (cfs)	For reducers and increasers		Type	dHv	A(ft <sup>2</sup> )	V (fps)	V <sup>2</sup> /2g	H (ft)	HGL (ft)	Notes
					D (in)	D (ft)								
<b>Break Tank</b>													-1.2 ft	Required Water Depth
													21.8 ft	Required Water Surface Elevation
Entrance		0.50	100	0.2	4.00	0.33		0.00	0.087	2.55	0.10	0.051	21.82	
Butterfly Valve		0.40	100	0.2	4.00	0.33		0.00	0.087	2.55	0.10	0.040	21.77	
Piping	2		100	0.2	4.00	0.33		0.00	0.087	2.55	0.10	0.012	21.73	
90° Elbow		0.32	100	0.2	4.00	0.33		0.00	0.087	2.55	0.10	0.032	21.72	
Piping	4		100	0.2	4.00	0.33		0.00	0.087	2.55	0.10	0.023	21.69	
90° Elbow		0.32	100	0.2	4.00	0.33		0.00	0.087	2.55	0.10	0.032	21.66	
Piping	4		100	0.2	4.00	0.33		0.00	0.087	2.55	0.10	0.023	21.63	
90° Elbow		0.32	100	0.2	4.00	0.33		0.00	0.087	2.55	0.10	0.032	21.61	
Piping	34		100	0.2	4.00	0.33		0.00	0.087	2.55	0.10	0.197	21.57	
90° Elbow		0.32	100	0.2	4.00	0.33		0.00	0.087	2.55	0.10	0.032	21.38	
Piping	40		100	0.2	4.00	0.33		0.00	0.087	2.55	0.10	0.232	21.35	
90° Elbow		0.32	100	0.2	4.00	0.33		0.00	0.087	2.55	0.10	0.032	21.11	
Piping	160		100	0.2	4.00	0.33		0.00	0.087	2.55	0.10	0.928	21.08	
90° Elbow		0.32	100	0.2	4.00	0.33		0.00	0.087	2.55	0.10	0.032	20.15	
Piping	6		100	0.2	4.00	0.33		0.00	0.087	2.55	0.10	0.035	20.12	
Tee (B to M)		0.32	100	0.2	8.00	0.67		0.00	0.349	0.64	0.01	0.002	20.09	
Piping	350		100	0.2	8.00	0.67		0.00	0.349	0.64	0.01	0.070	20.08	
45° Elbow		0.28	100	0.2	8.00	0.67		0.00	0.349	0.64	0.01	0.002	20.01	
Piping	30		100	0.2	8.00	0.67		0.00	0.349	0.64	0.01	0.006	20.01	
Exit		1.00	100	0.2	8.00	0.67		0.00	0.349	0.64	0.01	0.006	20.01	
<b>Total:</b>	<b>630</b>											<b>1.821</b>	<b>20 ft</b>	Elevation at Creek Discharge

---

Appendix C3  
RO Projections

This page intentionally left blank



## BOOSTER PUMP

RO program licensed to:  
 Calculation created by: GDW  
 Project name: Cambria  
 HP Pump flow: 529.3 gpm  
 Feed pressure: 92.6 psi  
 Feedwater Temperature: 20.0 C(68F)  
 Feed water pH: 7.00  
 Chem dose, ppm (100%): 30.4 H2SO4

Permeate flow: 487.00 gpm  
 Raw water flow: 529.3 gpm  
 Permeate recovery: 92.0 %  
 Element age: 0.0 years  
 Flux decline % per year: 7.0  
 Fouling Factor: 1.00  
 Salt passage increase, %/yr: 10.0

Average flux rate: 14.0 gfd  
 Feed type: Wastewater

Stage	Perm. Flow gpm	Flow/Vessel Feed gpm Conc gpm	Flux gfd	Beta	Conc.&Throt. Pressures psi	psi	Booster Pressure psi	Element Type	Elem. No.	Array
1-1	303.4	52.9 22.6	16.6	1.10	67.9	0.0		ESPA4 MAX	60	10x6
1-2	141.5	37.7 14.1	12.9	1.11	91.4	0.0	40.0	ESPA4 MAX	36	6x6
1-3	42.1	28.1 14.1	7.7	1.03	178.9	0.0	100.0	ESPA4 MAX	18	3x6

Ion	Raw water		Feed water		Permeate		Concentrate	
	mg/l	CaCO3	mg/l	CaCO3	mg/l	CaCO3	mg/l	CaCO3
Ca	79.2	197.5	79.2	197.5	3.699	9.2	947.5	2362.8
Mg	63.8	262.6	63.8	262.6	2.980	12.3	763.2	3140.9
Na	271.7	590.7	271.7	590.7	56.799	123.5	2743.1	5963.2
K	28.6	36.7	28.6	36.7	7.213	9.2	274.6	352.0
NH4	0.3	0.8	0.3	0.8	0.076	0.2	2.9	8.0
Ba	0.002	0.0	0.002	0.0	0.000	0.0	0.0	0.0
Sr	0.600	0.7	0.600	0.7	0.028	0.0	7.2	8.2
CO3	0.7	1.2	0.1	0.1	0.000	0.0	1.1	1.8
HCO3	244.6	200.5	207.4	170.0	78.749	64.5	1686.4	1382.3
SO4	117.7	122.6	147.5	153.7	5.674	5.9	1778.9	1853.0
Cl	539.0	760.2	539.0	760.2	57.049	80.5	6081.4	8577.5
F	0.1	0.3	0.1	0.3	0.027	0.1	0.9	2.5
NO3	5.3	4.3	5.3	4.3	4.287	3.5	17.0	13.7
B	0.32		0.32		0.310		0.43	
SiO2	22.0		22.0		6.24		203.21	
CO2	9.74		38.41		38.41		38.41	
TDS	1373.9		1365.9		223.1		14507.7	
pH	7.60		7.00		6.53		7.75	

	Raw water	Feed water	Concentrate
CaSO4 / Ksp * 100:	2%	3%	60%
SrSO4 / Ksp * 100:	1%	1%	29%
BaSO4 / Ksp * 100:	6%	7%	126%
SiO2 saturation:	18%	19%	165%
Langelier Saturation Index	0.17	-0.51	2.16
Stiff & Davis Saturation Index	0.14	-0.53	1.52
Ionic strength	0.03	0.03	0.31
Osmotic pressure	12.8 psi	12.6 psi	132.7 psi

Product performance calculations are based on nominal element performance when operated on a feed water of acceptable quality. The results shown on the printouts produced by this program are estimates of product performance. No guarantee of product or system performance is expressed or implied unless provided in a separate warranty statement signed by an authorized Hydranautics representative. Calculations for chemical consumption are provided for convenience and are based on various assumptions concerning water quality and composition. As the actual amount of chemical needed for pH adjustment is feedwater dependent and not membrane dependent, Hydranautics does not warrant chemical consumption. If a product or system warranty is required, please contact your Hydranautics representative. Non-standard or extended warranties may result in different pricing than previously quoted.

## BOOSTER PUMP

RO program licensed to:  
 Calculation created by: GDW  
 Project name: Cambria  
 HP Pump flow: 529.3 gpm  
 Feed pressure: 92.6 psi  
 Feedwater Temperature: 20.0 C(68F)  
 Feed water pH: 7.00  
 Chem dose, ppm (100%): 30.4 H2SO4

Permeate flow: 487.00 gpm  
 Raw water flow: 529.3 gpm  
 Permeate recovery: 92.0 %  
 Element age: 0.0 years  
 Flux decline % per year: 7.0  
 Fouling Factor: 1.00  
 Salt passage increase, %/yr: 10.0

Average flux rate: 14.0 gfd  
 Feed type: Wastewater

Stage	Perm. Flow gpm	Flow/Vessel Feed gpm	Conc gpm	Flux gfd	Beta	Conc.&Throt. Pressures psi	psi	Booster Pressure psi	Element Type	Elem. No.	Array
1-1	303.4	52.9	22.6	16.6	1.10	67.9	0.0		ESPA4 MAX	60	10x6
1-2	141.5	37.7	14.1	12.9	1.11	91.4	0.0	40.0	ESPA4 MAX	36	6x6
1-3	42.1	28.1	14.1	7.7	1.03	178.9	0.0	100.0	ESPA4 MAX	18	3x6

Stg	Elem no.	Feed pres psi	Pres drop psi	Perm flow gpm	Perm Flux gfd	Beta	Perm sal TDS	Conc osm pres	Ca	Cumulative Perm Mg	Ion levels Cl	B	SiO2
1-1	1	92.6	6.4	6.5	21.4	1.13	18.9	14.3	0.24	0.19	5	0.22	0.51
1-1	2	86.2	5.2	5.9	19.2	1.10	21.4	16.4	0.28	0.22	5	0.23	0.58
1-1	3	81.0	4.3	5.3	17.3	1.10	24.7	18.8	0.32	0.26	6	0.25	0.68
1-1	4	76.7	3.5	4.7	15.4	1.10	28.7	21.6	0.38	0.30	7	0.27	0.79
1-1	5	73.1	2.9	4.2	13.6	1.14	33.8	24.9	0.45	0.36	9	0.28	0.94
1-1	6	70.2	2.4	3.6	11.9	1.10	40.2	28.8	0.53	0.43	10	0.29	1.12
1-2	1	104.8	3.9	6.1	19.9	1.17	42.8	34.7	0.47	0.38	9	0.22	0.98
1-2	2	100.9	3.0	5.2	17.0	1.10	48.0	41.3	0.57	0.46	11	0.24	1.19
1-2	3	97.9	2.3	4.4	14.2	1.10	55.7	49.1	0.70	0.57	14	0.26	1.45
1-2	4	95.6	1.9	3.5	11.3	1.17	66.6	57.7	0.87	0.70	17	0.28	1.78
1-2	5	93.8	1.5	2.6	8.5	1.14	81.2	66.2	1.09	0.88	21	0.29	2.21
1-2	6	92.3	1.2	1.8	5.9	1.11	99.9	73.5	1.36	1.09	26	0.30	2.74
1-3	1	188.0	2.4	8.0	26.3	1.33	106.8	105.9	1.07	0.86	20	0.21	2.05
1-3	2	185.6	1.6	4.9	16.1	1.27	126.8	136.8	1.53	1.23	29	0.24	2.88
1-3	3	184.0	1.2	2.6	8.5	1.16	159.8	159.5	2.13	1.72	41	0.27	3.96
1-3	4	182.9	0.9	1.2	4.0	1.09	203.1	170.0	2.83	2.28	54	0.28	5.18
1-3	5	181.9	0.8	0.6	2.1	1.05	250.7	173.0	3.56	2.87	68	0.30	6.44
1-3	6	181.1	0.8	0.5	1.6	1.04	298.5	173.7	4.32	3.48	82	0.30	7.70

Stage	NDP psi
1-1	60.2
1-2	49.9
1-3	65.0

Product performance calculations are based on nominal element performance when operated on a feed water of acceptable quality. The results shown on the printouts produced by this program are estimates of product performance. No guarantee of product or system performance is expressed or implied unless provided in a separate warranty statement signed by an authorized Hydranautics representative. Calculations for chemical consumption are provided for convenience and are based on various assumptions concerning water quality and composition. As the actual amount of chemical needed for pH adjustment is feedwater dependent and not membrane dependent, Hydranautics does not warrant chemical consumption. If a product or system warranty is required, please contact your Hydranautics representative. Non-standard or extended warranties may result in different pricing than previously quoted.

## BOOSTER PUMP

RO program licensed to:				
Calculation created by:	GDW			
Project name:	Cambria		Permeate flow:	487.00 gpm
HP Pump flow:	529.3 gpm		Raw water flow:	529.3 gpm
Feed pressure:	92.6 psi		Permeate recovery:	92.0 %
Feedwater Temperature:	20.0 C(68F)			
Feed water pH:	7.00		Element age:	0.0 years
Chem dose, ppm (100%):	30.4 H2SO4		Flux decline % per year:	7.0
			Fouling Factor	1.00
			Salt passage increase, %/yr:	10.0
Average flux rate:	14.0 gfd		Feed type:	Wastewater

\*\*\*\*\*  
 \*\*\*\* THE FOLLOWING PARAMETERS EXCEED RECOMMENDED DESIGN LIMITS: \*\*\*  
 \*\*\*\*\*

Concentrate saturation of SiO<sub>2</sub> too high (165%)  
 Concentrate Langelier Saturation Index too high (2.16)

The following are recommended general guidelines for designing a reverse osmosis system using Hydranautics membrane elements. Please consult Hydranautics for specific recommendations for operation beyond the specified guidelines.

## Feed and Concentrate flow rate limits

Element diameter	Maximum feed flow rate	Minimum concentrate rate
8.0 inches	75 gpm (283.9 lpm)	12 gpm (45.4 lpm)
8.0 inches(Full Fit)	75 gpm (283.9 lpm)	30 gpm (113.6 lpm)

Concentrate polarization factor (beta) should not exceed 1.2 for standard elements

## Saturation limits for sparingly soluble salts in concentrate

Soluble salt	Saturation
BaSO <sub>4</sub>	6000%
CaSO <sub>4</sub>	230%
SrSO <sub>4</sub>	800%
SiO <sub>2</sub>	100%

Langelier Saturation Index for concentrate should not exceed 1.8

The above saturation limits only apply when using effective scale inhibitor.  
 Without scale inhibitor, concentrate saturation should not exceed 100%.

## BOOSTER PUMP

RO program licensed to:  
 Calculation created by: GDW  
 Project name: Cambria  
 HP Pump flow: 529.3 gpm  
 Feed pressure: 121.2 psi  
 Feedwater Temperature: 20.0 C(68F)  
 Feed water pH: 7.00  
 Chem dose, ppm (100%): 30.4 H2SO4

Permeate flow: 487.00 gpm  
 Raw water flow: 529.3 gpm  
 Permeate recovery: 92.0 %  
 Element age: 3.0 years  
 Flux decline % per year: 15.0  
 Fouling Factor: 0.61  
 Salt passage increase, %/yr: 10.0

Average flux rate: 14.0 gfd  
 Feed type: Wastewater

Stage	Perm. Flow gpm	Flow/Vessel Feed gpm Conc gpm	Flux gfd	Beta	Conc.&Throt. Pressures psi	psi	Booster Pressure psi	Element Type	Elem. No.	Array
1-1	278.8	52.9 25.1	15.2	1.13	94.6	0.0		ESPA4 MAX	60	10x6
1-2	150.1	41.8 16.7	13.6	1.10	114.3	0.0	40.0	ESPA4 MAX	36	6x6
1-3	58.1	33.5 14.1	10.6	1.09	199.3	0.0	100.0	ESPA4 MAX	18	3x6

Ion	Raw water		Feed water		Permeate		Concentrate	
	mg/l	CaCO3	mg/l	CaCO3	mg/l	CaCO3	mg/l	CaCO3
Ca	79.2	197.5	79.2	197.5	3.702	9.2	947.4	2362.7
Mg	63.8	262.6	63.8	262.6	2.982	12.3	763.2	3140.8
Na	271.7	590.7	271.7	590.7	56.537	122.9	2746.1	5969.7
K	28.6	36.7	28.6	36.7	7.169	9.2	275.1	352.6
NH4	0.3	0.8	0.3	0.8	0.075	0.2	2.9	8.0
Ba	0.002	0.0	0.002	0.0	0.000	0.0	0.0	0.0
Sr	0.600	0.7	0.600	0.7	0.028	0.0	7.2	8.2
CO3	0.7	1.2	0.1	0.1	0.000	0.0	1.1	1.8
HCO3	244.6	200.5	207.4	170.0	77.923	63.9	1695.9	1390.1
SO4	117.7	122.6	147.5	153.7	5.700	5.9	1778.6	1852.7
Cl	539.0	760.2	539.0	760.2	57.147	80.6	6080.3	8575.9
F	0.1	0.3	0.1	0.3	0.027	0.1	0.9	2.5
NO3	5.3	4.3	5.3	4.3	4.166	3.4	18.3	14.8
B	0.32		0.32		0.320		0.33	
SiO2	22.0		22.0		6.20		203.68	
CO2	9.74		38.41		38.41		38.41	
TDS	1373.9		1365.9		222.0		14521.0	
pH	7.60		7.00		6.52		7.76	

	Raw water	Feed water	Concentrate
CaSO4 / Ksp * 100:	2%	3%	60%
SrSO4 / Ksp * 100:	1%	1%	29%
BaSO4 / Ksp * 100:	6%	7%	126%
SiO2 saturation:	18%	19%	165%
Langelier Saturation Index	0.17	-0.51	2.16
Stiff & Davis Saturation Index	0.14	-0.53	1.52
Ionic strength	0.03	0.03	0.31
Osmotic pressure	12.8 psi	12.6 psi	132.9 psi

Product performance calculations are based on nominal element performance when operated on a feed water of acceptable quality. The results shown on the printouts produced by this program are estimates of product performance. No guarantee of product or system performance is expressed or implied unless provided in a separate warranty statement signed by an authorized Hydranautics representative. Calculations for chemical consumption are provided for convenience and are based on various assumptions concerning water quality and composition. As the actual amount of chemical needed for pH adjustment is feedwater dependent and not membrane dependent, Hydranautics does not warrant chemical consumption. If a product or system warranty is required, please contact your Hydranautics representative. Non-standard or extended warranties may result in different pricing than previously quoted.

## BOOSTER PUMP

RO program licensed to:

Calculation created by:

GDW

Project name:

Cambria

HP Pump flow:

529.3 gpm

Permeate flow:

487.00 gpm

Feed pressure:

121.2 psi

Raw water flow:

529.3 gpm

Feedwater Temperature:

20.0 C(68F)

Permeate recovery:

92.0 %

Feed water pH:

7.00

Element age:

3.0 years

Chem dose, ppm (100%):

30.4 H2SO4

Flux decline % per year:

15.0

Fouling Factor

0.61

Salt passage increase, %/yr:

10.0

Average flux rate:

14.0 gfd

Feed type:

Wastewater

Stage	Perm. Flow gpm	Flow/Vessel Feed gpm	Conc gpm	Flux gfd	Beta	Conc.&Throt. Pressures psi	psi	Booster Pressure psi	Element Type	Elem. No.	Array
1-1	278.8	52.9	25.1	15.2	1.13	94.6	0.0		ESPA4 MAX	60	10x6
1-2	150.1	41.8	16.7	13.6	1.10	114.3	0.0	40.0	ESPA4 MAX	36	6x6
1-3	58.1	33.5	14.1	10.6	1.09	199.3	0.0	100.0	ESPA4 MAX	18	3x6

Stg	Elem no.	Feed pres psi	Pres drop psi	Perm flow gpm	Perm Flux gfd	Beta	Perm sal TDS	Conc osm pres	Ca	Cumulative Perm Mg	Ion levels Cl	B	SiO2
1-1	1	121.2	6.5	5.5	18.1	1.10	28.6	14.0	0.36	0.29	7	0.32	0.77
1-1	2	114.7	5.5	5.1	16.8	1.10	31.3	15.7	0.40	0.33	8	0.32	0.86
1-1	3	109.2	4.7	4.8	15.6	1.11	35.0	17.6	0.46	0.37	9	0.32	0.96
1-1	4	104.5	4.0	4.4	14.5	1.12	39.4	19.9	0.52	0.42	10	0.32	1.09
1-1	5	100.6	3.3	4.1	13.4	1.13	44.8	22.6	0.59	0.48	11	0.32	1.24
1-1	6	97.3	2.7	3.8	12.4	1.14	51.3	25.9	0.68	0.55	13	0.32	1.43
1-2	1	131.5	4.6	5.3	17.4	1.13	54.2	30.2	0.63	0.51	12	0.31	1.31
1-2	2	126.9	3.8	4.9	15.9	1.10	59.3	34.6	0.73	0.59	14	0.32	1.51
1-2	3	123.2	3.1	4.4	14.4	1.15	66.2	40.0	0.85	0.68	16	0.32	1.74
1-2	4	120.1	2.5	3.9	12.9	1.15	75.5	46.4	0.99	0.80	19	0.32	2.03
1-2	5	117.6	2.0	3.5	11.3	1.16	87.7	53.9	1.18	0.95	23	0.32	2.39
1-2	6	115.6	1.6	2.9	9.6	1.10	103.8	62.4	1.41	1.14	27	0.32	2.84
1-3	1	211.0	3.2	7.0	23.0	1.23	110.8	81.6	1.25	1.00	24	0.29	2.42
1-3	2	207.8	2.2	5.7	18.7	1.10	125.9	102.1	1.59	1.28	30	0.30	3.03
1-3	3	205.5	1.6	4.4	14.3	1.10	149.8	126.0	2.04	1.64	39	0.31	3.81
1-3	4	203.9	1.2	3.1	10.0	1.19	185.3	149.6	2.64	2.12	50	0.31	4.84
1-3	5	202.7	1.0	1.9	6.3	1.14	233.7	167.2	3.39	2.73	64	0.31	6.10
1-3	6	201.7	0.8	1.2	4.0	1.10	292.0	177.3	4.28	3.44	81	0.31	7.51

Stage	NDP psi
1-1	89.5
1-2	81.9
1-3	90.6

Product performance calculations are based on nominal element performance when operated on a feed water of acceptable quality. The results shown on the printouts produced by this program are estimates of product performance. No guarantee of product or system performance is expressed or implied unless provided in a separate warranty statement signed by an authorized Hydranautics representative. Calculations for chemical consumption are provided for convenience and are based on various assumptions concerning water quality and composition. As the actual amount of chemical needed for pH adjustment is feedwater dependent and not membrane dependent, Hydranautics does not warrant chemical consumption. If a product or system warranty is required, please contact your Hydranautics representative. Non-standard or extended warranties may result in different pricing than previously quoted.

## BOOSTER PUMP

RO program licensed to:				
Calculation created by:	GDW			
Project name:	Cambria		Permeate flow:	487.00 gpm
HP Pump flow:	529.3 gpm		Raw water flow:	529.3 gpm
Feed pressure:	121.2 psi		Permeate recovery:	92.0 %
Feedwater Temperature:	20.0 C(68F)			
Feed water pH:	7.00		Element age:	3.0 years
Chem dose, ppm (100%):	30.4 H2SO4		Flux decline % per year:	15.0
			Fouling Factor	0.61
			Salt passage increase, %/yr:	10.0
Average flux rate:	14.0 gfd		Feed type:	Wastewater

\*\*\*\*\*  
 \*\*\*\* THE FOLLOWING PARAMETERS EXCEED RECOMMENDED DESIGN LIMITS: \*\*\*\*  
 \*\*\*\*\*

Concentrate saturation of SiO<sub>2</sub> too high (165%)  
 Concentrate Langelier Saturation Index too high (2.16)

The following are recommended general guidelines for designing a reverse osmosis system using Hydranautics membrane elements. Please consult Hydranautics for specific recommendations for operation beyond the specified guidelines.

## Feed and Concentrate flow rate limits

Element diameter	Maximum feed flow rate	Minimum concentrate rate
8.0 inches	75 gpm (283.9 lpm)	12 gpm (45.4 lpm)
8.0 inches(Full Fit)	75 gpm (283.9 lpm)	30 gpm (113.6 lpm)

Concentrate polarization factor (beta) should not exceed 1.2 for standard elements

## Saturation limits for sparingly soluble salts in concentrate

Soluble salt	Saturation
BaSO <sub>4</sub>	6000%
CaSO <sub>4</sub>	230%
SrSO <sub>4</sub>	800%
SiO <sub>2</sub>	100%

Langelier Saturation Index for concentrate should not exceed 1.8

The above saturation limits only apply when using effective scale inhibitor.  
 Without scale inhibitor, concentrate saturation should not exceed 100%.

## BOOSTER PUMP

RO program licensed to:  
 Calculation created by: GDW  
 Project name: Cambria  
 HP Pump flow: 529.3 gpm  
 Feed pressure: 151.7 psi  
 Feedwater Temperature: 20.0 C(68F)  
 Feed water pH: 7.00  
 Chem dose, ppm (100%): 30.4 H2SO4

Permeate flow: 487.00 gpm  
 Raw water flow: 529.3 gpm  
 Permeate recovery: 92.0 %  
 Element age: 5.0 years  
 Flux decline % per year: 15.0  
 Fouling Factor: 0.44  
 Salt passage increase, %/yr: 10.0

Average flux rate: 14.0 gfd  
 Feed type: Wastewater

Stage	Perm. Flow gpm	Flow/Vessel Feed gpm Conc gpm	Flux gfd	Beta	Conc.&Throt. Pressures psi	psi	Booster Pressure psi	Element Type	Elem. No.	Array
1-1	271.5	52.9 25.8	14.8	1.13	124.4	0.0		ESPA4 MAX	60	10x6
1-2	151.4	43.0 17.7	13.8	1.17	142.8	0.0	40.0	ESPA4 MAX	36	6x6
1-3	64.1	35.5 14.1	11.7	1.13	226.5	0.0	100.0	ESPA4 MAX	18	3x6

Ion	Raw water		Feed water		Permeate		Concentrate	
	mg/l	CaCO3	mg/l	CaCO3	mg/l	CaCO3	mg/l	CaCO3
Ca	79.2	197.5	79.2	197.5	3.838	9.6	945.9	2358.8
Mg	63.8	262.6	63.8	262.6	3.092	12.7	761.9	3135.6
Na	271.7	590.7	271.7	590.7	58.250	126.6	2726.4	5926.9
K	28.6	36.7	28.6	36.7	7.374	9.5	272.7	349.6
NH4	0.3	0.8	0.3	0.8	0.077	0.2	2.9	7.9
Ba	0.002	0.0	0.002	0.0	0.000	0.0	0.0	0.0
Sr	0.600	0.7	0.600	0.7	0.029	0.0	7.2	8.2
CO3	0.7	1.2	0.1	0.1	0.000	0.0	1.1	1.8
HCO3	244.6	200.5	207.4	170.0	79.772	65.4	1674.6	1372.6
SO4	117.7	122.6	147.5	153.7	5.933	6.2	1775.9	1849.9
Cl	539.0	760.2	539.0	760.2	59.290	83.6	6055.7	8541.1
F	0.1	0.3	0.1	0.3	0.027	0.1	0.9	2.5
NO3	5.3	4.3	5.3	4.3	4.167	3.4	18.3	14.8
B	0.32		0.32		0.320		0.32	
SiO2	22.0		22.0		6.38		201.67	
CO2	9.74		38.41		38.41		38.41	
TDS	1373.9		1365.9		228.5		14445.5	
pH	7.60		7.00		6.53		7.75	

	Raw water	Feed water	Concentrate
CaSO4 / Ksp * 100:	2%	3%	60%
SrSO4 / Ksp * 100:	1%	1%	29%
BaSO4 / Ksp * 100:	6%	7%	126%
SiO2 saturation:	18%	19%	164%
Langelier Saturation Index	0.17	-0.51	2.15
Stiff & Davis Saturation Index	0.14	-0.53	1.51
Ionic strength	0.03	0.03	0.31
Osmotic pressure	12.8 psi	12.6 psi	132.1 psi

Product performance calculations are based on nominal element performance when operated on a feed water of acceptable quality. The results shown on the printouts produced by this program are estimates of product performance. No guarantee of product or system performance is expressed or implied unless provided in a separate warranty statement signed by an authorized Hydranautics representative. Calculations for chemical consumption are provided for convenience and are based on various assumptions concerning water quality and composition. As the actual amount of chemical needed for pH adjustment is feedwater dependent and not membrane dependent, Hydranautics does not warrant chemical consumption. If a product or system warranty is required, please contact your Hydranautics representative. Non-standard or extended warranties may result in different pricing than previously quoted.

## BOOSTER PUMP

RO program licensed to:

Calculation created by:

GDW

Project name:

Cambria

HP Pump flow:

529.3 gpm

Permeate flow:

487.00 gpm

Feed pressure:

151.7 psi

Raw water flow:

529.3 gpm

Feedwater Temperature:

20.0 C(68F)

Permeate recovery:

92.0 %

Feed water pH:

7.00

Element age:

5.0 years

Chem dose, ppm (100%):

30.4 H2SO4

Flux decline % per year:

15.0

Fouling Factor

0.44

Salt passage increase, %/yr:

10.0

Average flux rate:

14.0 gfd

Feed type:

Wastewater

Stage	Perm. Flow gpm	Flow/Vessel Feed gpm	Conc gpm	Flux gfd	Beta	Conc.&Throt. Pressures psi	psi	Booster Pressure psi	Element Type	Elem. No.	Array
1-1	271.5	52.9	25.8	14.8	1.13	124.4	0.0		ESPA4 MAX	60	10x6
1-2	151.4	43.0	17.7	13.8	1.17	142.8	0.0	40.0	ESPA4 MAX	36	6x6
1-3	64.1	35.5	14.1	11.7	1.13	226.5	0.0	100.0	ESPA4 MAX	18	3x6

Stg	Elem no.	Feed pres psi	Pres drop psi	Perm flow gpm	Perm Flux gfd	Beta	Perm sal TDS	Conc osm pres	Ca	Cumulative Perm Mg	Cl	Ion levels B	SiO2
1-1	1	151.7	6.5	5.2	16.9	1.10	35.1	13.9	0.44	0.36	9	0.32	0.94
1-1	2	145.2	5.6	4.9	16.0	1.10	37.9	15.4	0.49	0.40	10	0.32	1.04
1-1	3	139.6	4.8	4.6	15.1	1.11	41.7	17.2	0.55	0.44	11	0.32	1.15
1-1	4	134.7	4.1	4.4	14.3	1.12	46.4	19.4	0.61	0.49	12	0.32	1.28
1-1	5	130.6	3.4	4.1	13.5	1.12	51.9	22.0	0.69	0.55	13	0.32	1.44
1-1	6	127.2	2.8	3.9	12.8	1.14	58.7	25.1	0.78	0.63	15	0.32	1.63
1-2	1	161.4	4.8	5.0	16.4	1.12	62.0	29.0	0.75	0.61	15	0.32	1.56
1-2	2	156.5	4.0	4.7	15.3	1.10	67.5	32.9	0.86	0.69	17	0.32	1.76
1-2	3	152.5	3.3	4.4	14.3	1.14	74.7	37.6	0.97	0.78	19	0.32	1.99
1-2	4	149.2	2.7	4.0	13.2	1.15	84.1	43.4	1.12	0.90	22	0.32	2.28
1-2	5	146.5	2.2	3.7	12.1	1.15	96.3	50.4	1.30	1.05	25	0.32	2.63
1-2	6	144.3	1.7	3.3	10.9	1.17	112.2	58.9	1.53	1.23	29	0.32	3.07
1-3	1	239.5	3.6	6.3	20.7	1.19	119.8	74.3	1.43	1.15	27	0.30	2.77
1-3	2	236.0	2.6	5.5	18.1	1.10	134.3	90.1	1.74	1.40	33	0.31	3.31
1-3	3	233.3	2.0	4.7	15.4	1.22	155.5	110.1	2.13	1.71	41	0.31	3.99
1-3	4	231.3	1.4	3.8	12.4	1.10	186.7	133.5	2.65	2.14	51	0.32	4.88
1-3	5	229.9	1.1	2.8	9.2	1.20	231.0	157.0	3.36	2.71	64	0.32	6.03
1-3	6	228.8	0.9	2.0	6.4	1.16	289.9	176.3	4.27	3.44	80	0.32	7.43

Stage	NDP psi
1-1	120.2
1-2	113.4
1-3	120.8

Product performance calculations are based on nominal element performance when operated on a feed water of acceptable quality. The results shown on the printouts produced by this program are estimates of product performance. No guarantee of product or system performance is expressed or implied unless provided in a separate warranty statement signed by an authorized Hydranautics representative. Calculations for chemical consumption are provided for convenience and are based on various assumptions concerning water quality and composition. As the actual amount of chemical needed for pH adjustment is feedwater dependent and not membrane dependent, Hydranautics does not warrant chemical consumption. If a product or system warranty is required, please contact your Hydranautics representative. Non-standard or extended warranties may result in different pricing than previously quoted.



## BOOSTER PUMP

RO program licensed to:				
Calculation created by:	GDW			
Project name:	Cambria		Permeate flow:	487.00 gpm
HP Pump flow:	529.3 gpm		Raw water flow:	529.3 gpm
Feed pressure:	151.7 psi		Permeate recovery:	92.0 %
Feedwater Temperature:	20.0 C(68F)			
Feed water pH:	7.00		Element age:	5.0 years
Chem dose, ppm (100%):	30.4 H2SO4		Flux decline % per year:	15.0
			Fouling Factor	0.44
			Salt passage increase, %/yr:	10.0
Average flux rate:	14.0 gfd		Feed type:	Wastewater

\*\*\*\*\*  
 \*\*\*\* THE FOLLOWING PARAMETERS EXCEED RECOMMENDED DESIGN LIMITS: \*\*\*  
 \*\*\*\*\*

Concentrate saturation of SiO<sub>2</sub> too high (164%)  
 Concentrate Langelier Saturation Index too high (2.15)

The following are recommended general guidelines for designing a reverse osmosis system using Hydranautics membrane elements. Please consult Hydranautics for specific recommendations for operation beyond the specified guidelines.

## Feed and Concentrate flow rate limits

Element diameter	Maximum feed flow rate	Minimum concentrate rate
8.0 inches	75 gpm (283.9 lpm)	12 gpm (45.4 lpm)
8.0 inches(Full Fit)	75 gpm (283.9 lpm)	30 gpm (113.6 lpm)

Concentrate polarization factor (beta) should not exceed 1.2 for standard elements

## Saturation limits for sparingly soluble salts in concentrate

Soluble salt	Saturation
BaSO <sub>4</sub>	6000%
CaSO <sub>4</sub>	230%
SrSO <sub>4</sub>	800%
SiO <sub>2</sub>	100%

Langelier Saturation Index for concentrate should not exceed 1.8

The above saturation limits only apply when using effective scale inhibitor.  
 Without scale inhibitor, concentrate saturation should not exceed 100%.



---

# Appendix C4

## Product Water Stabilization

This page intentionally left blank

**The RTW Model**

Ver. 4.0

ID: **AWTP Post-Treatment at Yr 0**

STEP 1: Enter initial water characteristics.

Measured TDS	<b>223</b>	mg/L
Measured temperature	<b>20</b>	deg C
Measured pH	<b>6.53</b>	
Measured alk, as CaCO3	<b>64.5</b>	mg/L
Measured Ca, as CaCO3	<b>9</b>	mg/L
Measured Cl	<b>80</b>	mg/L
Measured SO4	<b>5.9</b>	mg/L

For CT and TTHM functions enter current:

Treated water pH	
Chlorine residual	mg/L
Chlorine or hypochlorite dose as chlorine equivalent	mg/L

STEP 2: Enter amount of each chemical to be added (expressed as 100% chemical). Press **Ctrl+X** to select chemicals for this list.

Alum *14H2O	<b>0</b>	mg/L
Calcium carbonate	<b>0</b>	mg/L
Calcium chloride	<b>30</b>	mg/L
Caustic soda	<b>34</b>	mg/L
Phosphoric acid	<b>0</b>	mg/L
Potassium Hydroxide	<b>0</b>	mg/L
Soda ash	<b>0</b>	mg/L
Sodium bicarbonate	<b>0</b>	mg/L
Zinc Sulfate	<b>0</b>	mg/L
Ctrl+X to add to list	<b>0</b>	mg/L

STEP 3: Adjust at Step 2 until interim water characteristics meet your criteria.

Theoretical interim water characteristics	Desired	Theoretical interim water characteristics	Desired		
Interim alkalinity	107 mg/L	> 40 mg/L	Interim pH	8.76	6.8-9.3
Interim Ca, as CaCO3	36 mg/L	> 40 mg/L	Precipitation potential	6.01 mg/L	4-10 mg/L
Alk/(Cl+SO4)	1.0	> 5.0	Langelier index	0.59	>0

Press PAGE DOWN for additional initial, interim and final water characteristics if desired.

Calculated initial water characteristics

Initial acidity	143	mg/L
Initial Ca sat, as CaCO3	2618	mg/L
Initial DIC, as CaCO3	208	mg/L

Theoretical interim water characteristics

Interim acidity	101	mg/L
Interim Ca sat, as CaCO3	10	mg/L
Ryznar index	7.58	
Interim DIC, as CaCO3	208	mg/L
Aggressiveness Index	12.35	

Theoretical final water characteristics after CaCO3 precipitation

Final alkalinity	101	mg/L
Final Ca	30	mg/L
Final acidity	101	mg/L
Final pH	8.29	
Final DIC, as CaCO3	202	mg/L

Press PAGE UP to review measured initial water characteristics, chemical addition quantities and additional interim water characteristics.

CT and TTHM Results

Required chlorine residual to maintain current level of giardia inactivation	N/A	mg/L
Estimated maximum total trihalomethane concentration change from current level	N/A	%

**The RTW Model**

Ver. 4.0

ID: **AWTP Post-Treatment at Yr 3**

STEP 1: Enter initial water characteristics.

Measured TDS	<b>222</b>	mg/L
Measured temperature	<b>20</b>	deg C
Measured pH	<b>6.52</b>	
Measured alk, as CaCO3	<b>63.9</b>	mg/L
Measured Ca, as CaCO3	<b>9.2</b>	mg/L
Measured Cl	<b>80.6</b>	mg/L
Measured SO4	<b>5.9</b>	mg/L

For CT and TTHM functions enter current:

Treated water pH	
Chlorine residual	mg/L
Chlorine or hypochlorite dose as chlorine equivalent	mg/L

STEP 2: Enter amount of each chemical to be added (expressed as 100% chemical). Press **Ctrl+X** to select chemicals for this list.

Alum *14H2O	<b>0</b>	mg/L
Calcium carbonate	<b>0</b>	mg/L
Calcium chloride	<b>30</b>	mg/L
Caustic soda	<b>34</b>	mg/L
Phosphoric acid	<b>0</b>	mg/L
Potassium Hydroxide	<b>0</b>	mg/L
Soda ash	<b>0</b>	mg/L
Sodium bicarbonate	<b>0</b>	mg/L
Zinc Sulfate	<b>0</b>	mg/L
Ctrl+X to add to list	<b>0</b>	mg/L

STEP 3: Adjust at Step 2 until interim water characteristics meet your criteria.

Theoretical interim water characteristics	Desired	Theoretical interim water characteristics	Desired		
Interim alkalinity	106 mg/L	> 40 mg/L	Interim pH	8.69	6.8-9.3
Interim Ca, as CaCO3	36 mg/L	> 40 mg/L	Precipitation potential	5.08 mg/L	4-10 mg/L
Alk/(Cl+SO4)	1.0	> 5.0	Langelier index	0.52	>0

Press PAGE DOWN for additional initial, interim and final water characteristics if desired.

Calculated initial water characteristics

Initial acidity	144	mg/L
Initial Ca sat, as CaCO3	2703	mg/L
Initial DIC, as CaCO3	208	mg/L

Theoretical interim water characteristics

Interim acidity	101	mg/L
Interim Ca sat, as CaCO3	12	mg/L
Ryznar index	7.65	
Interim DIC, as CaCO3	208	mg/L
Aggressiveness Index	12.28	

Theoretical final water characteristics after CaCO3 precipitation

Final alkalinity	101	mg/L
Final Ca	31	mg/L
Final acidity	101	mg/L
Final pH	8.27	
Final DIC, as CaCO3	203	mg/L

Press PAGE UP to review measured initial water characteristics, chemical addition quantities and additional interim water characteristics.

CT and TTHM Results

Required chlorine residual to maintain current level of giardia inactivation	N/A	mg/L
Estimated maximum total trihalomethane concentration change from current level	N/A	%

**The RTW Model**

Ver. 4.0

ID: **AWTP Post-Treatment at Yr 5**

STEP 1: Enter initial water characteristics.

Measured TDS	<b>228.5</b>	mg/L
Measured temperature	<b>20</b>	deg C
Measured pH	<b>6.53</b>	
Measured alk, as CaCO3	<b>65.4</b>	mg/L
Measured Ca, as CaCO3	<b>9.6</b>	mg/L
Measured Cl	<b>83.6</b>	mg/L
Measured SO4	<b>6.2</b>	mg/L

For CT and TTHM functions enter current:

Treated water pH	
Chlorine residual	mg/L
Chlorine or hypochlorite dose as chlorine equivalent	mg/L

STEP 2: Enter amount of each chemical to be added (expressed as 100% chemical). Press **Ctrl+X** to select chemicals for this list.

Alum *14H2O	<b>0</b>	mg/L
Calcium carbonate	<b>0</b>	mg/L
Calcium chloride	<b>30</b>	mg/L
Caustic soda	<b>34</b>	mg/L
Phosphoric acid	<b>0</b>	mg/L
Potassium Hydroxide	<b>0</b>	mg/L
Soda ash	<b>0</b>	mg/L
Sodium bicarbonate	<b>0</b>	mg/L
Zinc Sulfate	<b>0</b>	mg/L
Ctrl+X to add to list	<b>0</b>	mg/L

STEP 3: Adjust at Step 2 until interim water characteristics meet your criteria.

Theoretical interim water characteristics	Desired	Theoretical interim water characteristics	Desired		
Interim alkalinity	108 mg/L	> 40 mg/L	Interim pH	8.70	6.8-9.3
Interim Ca, as CaCO3	37 mg/L	> 40 mg/L	Precipitation potential	5.29 mg/L	4-10 mg/L
Alk/(Cl+SO4)	1.0	> 5.0	Langelier index	0.54	>0

Press PAGE DOWN for additional initial, interim and final water characteristics if desired.

Calculated initial water characteristics

Initial acidity	145	mg/L
Initial Ca sat, as CaCO3	2591	mg/L
Initial DIC, as CaCO3	211	mg/L

Theoretical interim water characteristics

Interim acidity	103	mg/L
Interim Ca sat, as CaCO3	11	mg/L
Ryznar index	7.62	
Interim DIC, as CaCO3	211	mg/L
Aggressiveness Index	12.30	

Theoretical final water characteristics after CaCO3 precipitation

Final alkalinity	103	mg/L
Final Ca	31	mg/L
Final acidity	103	mg/L
Final pH	8.26	
Final DIC, as CaCO3	205	mg/L

Press PAGE UP to review measured initial water characteristics, chemical addition quantities and additional interim water characteristics.

CT and TTHM Results

Required chlorine residual to maintain current level of giardia inactivation	N/A	mg/L
Estimated maximum total trihalomethane concentration change from current level	N/A	%





Appendix D  
Water Quality Information

This page intentionally left blank

Appendix D1  
Effluent

This page intentionally left blank

May 2, 2014

**Cambria Community Services Dist.**  
 P.O. Box 65  
 Cambria, CA 93428

Lab ID : CC 1481152  
 Customer : 8-49

### Laboratory Report

**Introduction:** This report package contains total of 35 pages divided into 3 sections:

Case Narrative (5 pages) : An overview of the work performed at FGL.  
 Sample Results (11 pages) : Results for each sample submitted.  
 Quality Control (19 pages) : Supporting Quality Control (QC) results.

### Case Narrative

This Case Narrative pertains to the following samples:

Sample Description	Date Sampled	Date Received	FGL Lab ID #	Matrix
Effluent	04/07/2014	04/07/2014	CC 1481152-001	DW
Lab Duplicate	04/07/2014	04/07/2014	CC 1481152-002	DW

**Sampling and Receipt Information:** All samples were received, prepared and analyzed within the method specified holding except those as listed in the table below. The holding time for Chlorine, Total, Fluoride-Soluble, Oxygen, Dissolved, pH are listed as immediate. Logistically this is very difficult to obtain. FGL policy is to analyze all samples requiring Chlorine, Total, Fluoride-Soluble, Oxygen, Dissolved, pH on the same day of receipt at the laboratory. If this presents any problem please call.

Lab ID	Analyte/Method	Required Holding Time	Actual Holding Time
CC 1481152-001	Chlorine, Total	15	1626 Minutes
CC 1481152-001	Oxygen, Dissolved	15	1465.2 Minutes
CC 1481152-001	pH	15	1513.8 Minutes
CC 1481152-002	Chlorine, Total	15	1626 Minutes
CC 1481152-002	Oxygen, Dissolved	15	1465.2 Minutes
CC 1481152-002	pH	15	1513.8 Minutes

All samples arrived on ice. All samples were checked for pH if acid or base preservation is required (except for VOAs). For details of sample receipt information, please see the attached Chain of Custody and Condition Upon Receipt Form.

May 2, 2014  
**Cambria Community Services Dist.**

Lab ID : CC 1481152  
 Customer : 8-49

**Quality Control:** All samples were prepared and analyzed according to the following tables:

**Inorganic - Metals QC**

200.1	04/09/2014:203992 All preparation quality controls are within established criteria, except: The following note applies to Potassium: 435 Sample matrix may be affecting this analyte. Data was accepted based on the LCS or CCV recovery.
200.7	04/08/2014:204998 All analysis quality controls are within established criteria.
	04/11/2014:205258 All analysis quality controls are within established criteria.
	04/14/2014:205303 All analysis quality controls are within established criteria.
	04/08/2014:203919 All preparation quality controls are within established criteria.
200.8	04/08/2014:205020 All analysis quality controls are within established criteria.
	04/11/2014:205275 All analysis quality controls are within established criteria.
	04/08/2014:203897 All preparation quality controls are within established criteria, except: The following note applies to Aluminum: 435 Sample matrix may be affecting this analyte. Data was accepted based on the LCS or CCV recovery.
	04/09/2014:203991 All preparation quality controls are within established criteria.
245.1	04/23/2014:205795 All analysis quality controls are within established criteria.
	04/22/2014:205797 All analysis quality controls are within established criteria.
	04/21/2014:204485 All preparation quality controls are within established criteria.
	04/22/2014:204508 All preparation quality controls are within established criteria.

**Organic QC**

5310C	04/21/2014:205697 All analysis quality controls are within established criteria.
	04/29/2014:206169 All analysis quality controls are within established criteria.
	04/21/2014:204248 All preparation quality controls are within established criteria.
	04/29/2014:204651 All preparation quality controls are within established criteria.

May 2, 2014  
**Cambria Community Services Dist.**

Lab ID : CC 1481152  
 Customer : 8-49

### Organic QC

608	04/25/2014:205975 All analysis quality controls are within established criteria.
	04/12/2014:204150 All preparation quality controls are within established criteria.
625	04/18/2014:205766 All analysis quality controls are within established criteria, except: The following note applies to 2,4,6-Tribromophenol, 2,4-Dichlorophenol, 2,4-Dimethylphenol, 2-Nitrophenol, 4,6-Dinitro-o-cresol, 4-Nitrophenol, Di-n-b: 360 CCV above Acceptance Range (AR). Samples which were non detect for this analyte were accepted. The following note applies to 2,4,6-Tribromophenol: 362 Surrogates are qualified on Control Chart Limits, these are CCV limits. See individual sample reports.
	04/14/2014:204202 All preparation quality controls are within established criteria, except: The following note applies to 1,2,4-Trichlorobenzene, 1,2-Dichlorobenzene, 1,3-Dichlorobenzene, 1,4-Dichlorobenzene, 2-Fluorobiphenyl, 2-Fluorophenol,: 410 Relative Percent Difference (RPD) not within Maximum Allowable Value (MAV). Data was accepted based on the LCS or CCV recovery. The following note applies to Di-n-octylphthalate: 310 LCS above Acceptance Range (AR). Samples which were non detect for this analyte were accepted.
625P	04/14/2014:205423 All analysis quality controls are within established criteria.
	04/11/2014:204133 All preparation quality controls are within established criteria, except: The following note applies to Lindane: 436 Blank Spike (BS) not within Acceptance Range (AR). Data was accepted based on the LCS or CCV recovery. The following note applies to p,p`-DDD: 410 Relative Percent Difference (RPD) not within Maximum Allowable Value (MAV). Data was accepted based on the LCS or CCV recovery.

### Radio QC

900.0	04/23/2014:205882 All analysis quality controls are within established criteria.
	04/23/2014:205883 All analysis quality controls are within established criteria.
	04/22/2014:204487 All preparation quality controls are within established criteria.
903.0	04/22/2014:205794 All analysis quality controls are within established criteria.
	04/21/2014:204469 All preparation quality controls are within established criteria.
Ra - 05	04/26/2014:206060 All analysis quality controls are within established criteria.
	04/26/2014:206061 All analysis quality controls are within established criteria.

May 2, 2014  
**Cambria Community Services Dist.**

Lab ID : CC 1481152  
 Customer : 8-49

**Radio QC**

Ra - 05	04/22/2014:204537 All preparation quality controls are within established criteria.
---------	---

**Inorganic - Wet Chemistry QC**

2320B	04/09/2014:205108 All analysis quality controls are within established criteria.
	04/09/2014:204015 All preparation quality controls are within established criteria, except: The following note applies to Alkalinity (as CaCO <sub>3</sub> ), Bicarbonate: 440 Sample nonhomogeneity may be affecting this analyte. Data was accepted based on the LCS or CCV recovery.
2510B	04/09/2014:205010 All analysis quality controls are within established criteria.
	04/09/2014:203963 All preparation quality controls are within established criteria.
2540CE	04/09/2014:204007 All preparation quality controls are within established criteria.
2540D	04/09/2014:203996 All preparation quality controls are within established criteria.
300.0	04/08/2014:205031 All analysis quality controls are within established criteria.
	04/08/2014:203952 All preparation quality controls are within established criteria, except: The following note applies to Bromide, Chloride, Nitrate: 435 Sample matrix may be affecting this analyte. Data was accepted based on the LCS or CCV recovery.
351.2	04/10/2014:204017 All preparation quality controls are within established criteria.
4500CIG	04/08/2014:206185 All analysis quality controls are within established criteria.
	04/08/2014:204823 All preparation quality controls are within established criteria.
4500CNCE	04/20/2014:205595 All analysis quality controls are within established criteria.
	04/20/2014:203866 All preparation quality controls are within established criteria.
4500COC	04/08/2014:203942 All preparation quality controls are within established criteria.
4500-H B	04/08/2014:203926 All preparation quality controls are within established criteria.
4500HB	04/08/2014:204970 All analysis quality controls are within established criteria.
4500NH3B	04/15/2014:204229 All preparation quality controls are within established criteria, except:



May 2, 2014  
Cambria Community Services Dist.

Lab ID : CC 1481152  
Customer : 8-49

### Inorganic - Wet Chemistry QC

4500NH3B	The following note applies to Ammonia Nitrogen: 435 Sample matrix may be affecting this analyte. Data was accepted based on the LCS or CCV recovery.
4500NH3G	04/16/2014:205422 All analysis quality controls are within established criteria.
4500-O G	04/08/2014:203906 All preparation quality controls are within established criteria.
4500-P E	04/08/2014:203923 All preparation quality controls are within established criteria.
4500PE	04/08/2014:204968 All analysis quality controls are within established criteria.
4500S D	04/14/2014:204206 All preparation quality controls are within established criteria.
4500S2	04/14/2014:205321 All analysis quality controls are within established criteria.
5210B	04/08/2014:204963 All analysis quality controls are within established criteria.
EPA351.2	04/16/2014:205341 All analysis quality controls are within established criteria.

**Certification::** I certify that this data package is in compliance with ELAP standards, both technically and for completeness, except for any conditions listed above. Release of the data contained in this data package is authorized by the Laboratory Director or his designee, as verified by the following electronic signature.

KD:DMB

Approved By **Kelly A. Dunnahoo, B.S.**



Digitally signed by Kelly A. Dunnahoo, B.S.  
Title: Laboratory Director  
Date: 2014-05-02

May 2, 2014

Lab ID : CC 1481152-001

Customer ID : 8-49

**Cambria Community Services Dist.**

P.O. Box 65

Cambria, CA 93428

Sampled On : April 7, 2014-13:45

Sampled By : B.Pfeifle

Received On : April 7, 2014-15:55

Matrix : Drinking Water

Description : Effluent

Project : Special Well Testing

**Sample Result - Inorganic**

Constituent	Result	PQL	Units	MCL/AL	Sample Preparation		Sample Analysis	
					Method	Date/ID	Method	Date/ID
<b>Metals, Diss<sup>P:1</sup></b>								
Arsenic	ND	2	ug/L	10	200.8	04/08/14:203897	200.8	04/08/14:205020
Cadmium	ND	0.2	ug/L	5	200.8	04/08/14:203897	200.8	04/08/14:205020
Chromium	ND	1	ug/L	50	200.8	04/08/14:203897	200.8	04/08/14:205020
Iron	110	50	ug/L	300 <sup>2</sup>	200.7	04/08/14:203919	200.7	04/08/14:204998
Lead	0.7	0.5	ug/L	15	200.8	04/08/14:203897	200.8	04/08/14:205020
Manganese	6.9	0.5	ug/L	50 <sup>2</sup>	200.8	04/08/14:203897	200.8	04/08/14:205020
Mercury	ND	0.02	ug/L	2	245.1	04/22/14:204508	245.1	04/23/14:205795
Nickel	2	1	ug/L	100	200.8	04/08/14:203897	200.8	04/08/14:205020
Silica	20	--	mg/L		200.7	04/08/14:203919	200.7	04/08/14:204998
Silver	ND	1	ug/L	100 <sup>2</sup>	200.8	04/08/14:203897	200.8	04/08/14:205020
<b>Metals, Total<sup>P:15</sup></b>								
Aluminum	ND	10	ug/L	1000	200.8	04/08/14:203897	200.8	04/08/14:205020
Arsenic	ND	2	ug/L	10	200.8	04/09/14:203991	200.8	04/11/14:205275
Barium	80.5	0.2	ug/L	1000	200.8	04/08/14:203897	200.8	04/08/14:205020
Boron	0.32	0.01	mg/L		200.8	04/08/14:203897	200.8	04/08/14:205020
Cadmium	0.2	0.2	ug/L	5	200.8	04/09/14:203991	200.8	04/11/14:205275
Calcium	72	1	mg/L		200.1	04/09/14:203992	200.7	04/11/14:205258
Chromium	ND	1	ug/L	50	200.8	04/09/14:203991	200.8	04/11/14:205275
Iron	150	50	ug/L	300 <sup>2</sup>	200.1	04/09/14:203992	200.7	04/11/14:205258
Lead	1.7	0.5	ug/L	15	200.8	04/09/14:203991	200.8	04/11/14:205275
Magnesium	58	1	mg/L		200.1	04/09/14:203992	200.7	04/11/14:205258
Manganese	6.9	0.5	ug/L	50 <sup>2</sup>	200.8	04/08/14:203897	200.8	04/08/14:205020
Mercury	ND	0.02	ug/L	2	245.1	04/21/14:204485	245.1	04/22/14:205797
Nickel	3	1	ug/L	100	200.8	04/09/14:203991	200.8	04/11/14:205275
Potassium	26	1	mg/L		200.1	04/09/14:203992	200.7	04/14/14:205303
Silver	ND	1	ug/L	100 <sup>2</sup>	200.8	04/09/14:203991	200.8	04/11/14:205275
Sodium	247	1	mg/L		200.1	04/09/14:203992	200.7	04/11/14:205258
Strontium	545	5	ug/L		200.1	04/09/14:203992	200.7	04/11/14:205258
Zinc	70	10	ug/L		200.8	04/08/14:203897	200.8	04/08/14:205020
<b>Wet Chemistry<sup>P:1</sup></b>								
Ammonia Nitrogen	0.3	0.2	mg/L		4500NH3B	04/15/14:204229	4500NH3G	04/16/14:205422
Alkalinity (as CaCO3)	210	10	mg/L		2320B	04/09/14:204015	2320B	04/09/14:205108
Bicarbonate	250	10	mg/L		2320B	04/09/14:204015	2320B	04/09/14:205108
Carbonate	ND	10	mg/L		2320B	04/09/14:204015	2320B	04/09/14:205108
Hydroxide	ND	10	mg/L		2320B	04/09/14:204015	2320B	04/09/14:205108

May 2, 2014  
 Description : Effluent

Lab ID : CC 1481152-001  
 Customer ID : 8-49

**Sample Result - Inorganic**

Constituent	Result	PQL	Units	MCL/AL	Sample Preparation		Sample Analysis	
					Method	Date/ID	Method	Date/ID
<b>Wet Chemistry</b> <sup>P:1</sup>								
Bromide	0.93	0.03	mg/L		300.0	04/08/14:203952	300.0	04/08/14:205031
Carbon Dioxide	12	1	mg/L		4500COC	04/08/14:203942	4500COC	04/08/14:204991
Chloride	347	5*	mg/L	500 <sup>2</sup>	300.0	04/08/14:203952	300.0	04/08/14:205031
Chlorine, Total	ND	0.1	mg/L		4500CIG	04/08/14:204823	4500CIG	04/08/14:206185
Specific Conductance	1940	1	umhos/cm	1600 <sup>2</sup>	2510B	04/09/14:203963	2510B	04/09/14:205010
Cyanide, Total	ND	0.004	mg/L	0.15	4500CNCE	04/20/14:203866	4500CNCE	04/20/14:205595
Fluoride	0.1	0.1	mg/L	2	300.0	04/08/14:203952	300.0	04/08/14:205031
Nitrate	142	2*	mg/L	45	300.0	04/08/14:203952	300.0	04/08/14:205031
Nitrite	ND	0.3	mg/L	3.3	300.0	04/08/14:203952	300.0	04/08/14:205031
Nitrogen, Total Kjeldahl	ND	1	mg/L		351.2	04/10/14:204017	EPA351.2	04/16/14:205341
Oxygen, Dissolved	6.3	0.5	mg/L		4500-O G	04/08/14:203906	5210B	04/08/14:204963
pH	7.6	--	units		4500-H B	04/08/14:203926	4500HB	04/08/14:204970
Phosphate	18	3*	mg/L		4500-P E	04/08/14:203923	4500PE	04/08/14:204968
Solids, Total Dissolved (TDS)	1110	20	mg/L	1000 <sup>2</sup>	2540CE	04/09/14:204007	2540C	04/10/14:205100
Solids, Total Suspended (TSS)	6	1	mg/L		2540D	04/09/14:203996	2540D	04/11/14:205221
Sulfate	107	2	mg/L	500 <sup>2</sup>	300.0	04/08/14:203952	300.0	04/08/14:205031
Sulfide, Total	ND	0.1	mg/L		4500S D	04/14/14:204206	4500S2	04/14/14:205321

ND=Non-Detected. PQL=Practical Quantitation Limit. Containers: (AGT) Amber Glass TFE-Cap, (AVT) Amber VOA TFE-Cap, (DO) , (N/A) Not Applicable COC Only, (P) Plastic, (PST) Preservatives: H2SO4 pH < 2, NaOH, NaOH + Zinc Acetate, H2SO4 pH < 2, HNO3 pH < 2, HNO3 pH < 2  
 ‡Surrogate. \* PQL adjusted for dilution.

MCL = Maximum Contamination Level. 2 - Secondary Standard. 3 - CDPH Notification Level. AL = Regulatory Action Level.

May 2, 2014

Lab ID : CC 1481152-001

Customer ID : 8-49

**Cambria Community Services Dist.**

P.O. Box 65  
Cambria, CA 93428

Sampled On : April 7, 2014-13:45

Sampled By : B.Pfeifle

Received On : April 7, 2014-15:55

Matrix : Drinking Water

Description : Effluent

Project : Special Well Testing

**Sample Result - Organic**

Constituent	Result	PQL	Units	MCL/AL	Sample Preparation		Sample Analysis	
					Method	Date/ID	Method	Date/ID
<b>EPA 608<sup>AGT:1</sup></b>								
Tetrachloro-m-xylene <sup>‡</sup>	57.6	45-112	%	0.1	608	04/12/14:204150	608	04/25/14:205975
Chlordane	ND	2	ug/L		608	04/12/14:204150	608	04/25/14:205975
Toxaphene	ND	0.5	ug/L		608	04/12/14:204150	608	04/25/14:205975
PCB 1016	ND	0.5	ug/L		608	04/12/14:204150	608	04/25/14:205975
PCB 1221	ND	0.5	ug/L		608	04/12/14:204150	608	04/25/14:205975
PCB 1232	ND	0.5	ug/L		608	04/12/14:204150	608	04/25/14:205975
PCB 1242	ND	0.5	ug/L		608	04/12/14:204150	608	04/25/14:205975
PCB 1248	ND	0.5	ug/L		608	04/12/14:204150	608	04/25/14:205975
PCB 1254	ND	0.5	ug/L		608	04/12/14:204150	608	04/25/14:205975
PCB 1260	ND	0.5	ug/L		608	04/12/14:204150	608	04/25/14:205975
<b>EPA 625<sup>AGT:1</sup></b>								
2-Fluorobiphenyl <sup>‡</sup>	26.1	16-104	%	0.2	625	04/14/14:204202	625	04/18/14:205766
2-Fluorophenol <sup>‡</sup>	22.7	20-98	%		625	04/14/14:204202	625	04/18/14:205766
Nitrobenzene-d5 <sup>‡</sup>	26.6	21-99	%		625	04/14/14:204202	625	04/18/14:205766
Phenol-d6 <sup>‡</sup>	19.8	18-103	%		625	04/14/14:204202	625	04/18/14:205766
p-Terphenyl-d14 <sup>‡</sup>	19.2	13-142	%		625	04/14/14:204202	625	04/18/14:205766
2,4,6-Tribromophenol <sup>‡</sup>	44.4	15-124	%		625	04/14/14:204202	625	04/18/14:205766
Acenaphthene	ND	1	ug/L		625	04/14/14:204202	625	04/18/14:205766
Acenaphthylene	ND	1	ug/L		625	04/14/14:204202	625	04/18/14:205766
Anthracene	ND	1	ug/L		625	04/14/14:204202	625	04/18/14:205766
Benzidine	ND	10	ug/L		625	04/14/14:204202	625	04/18/14:205766
Benzo(a)anthracene	ND	1	ug/L		625	04/14/14:204202	625	04/18/14:205766
Benzo(b)fluoranthene	ND	1	ug/L		625	04/14/14:204202	625	04/18/14:205766
Benzo(k)fluoranthene	ND	1	ug/L		625	04/14/14:204202	625	04/18/14:205766
Benzo(g,h,i)perylene	ND	1	ug/L		625	04/14/14:204202	625	04/18/14:205766
Benzo(a)pyrene	ND	1	ug/L		625	04/14/14:204202	625	04/18/14:205766
4-Bromophenylphenylether	ND	1	ug/L		625	04/14/14:204202	625	04/18/14:205766
Butylbenzylphthalate	ND	2	ug/L		625	04/14/14:204202	625	04/18/14:205766
bis(2-Chloroethoxy)methane	ND	1	ug/L		625	04/14/14:204202	625	04/18/14:205766
bis(2-Chloroethyl)ether	ND	1	ug/L	625	04/14/14:204202	625	04/18/14:205766	
bis(2-Chloroisopropyl)ether	ND	1	ug/L	625	04/14/14:204202	625	04/18/14:205766	
bis(2-Ethylhexyl)phthalate	ND	2	ug/L	625	04/14/14:204202	625	04/18/14:205766	
4-Chloro-3-methylphenol	ND	2	ug/L	625	04/14/14:204202	625	04/18/14:205766	
2-Chloronaphthalene	ND	1	ug/L	625	04/14/14:204202	625	04/18/14:205766	
2-Chlorophenol	ND	2	ug/L	625	04/14/14:204202	625	04/18/14:205766	

May 2, 2014  
Description : Effluent

Lab ID : CC 1481152-001  
Customer ID : 8-49

**Sample Result - Organic**

Constituent	Result	PQL	Units	MCL/AL	Sample Preparation		Sample Analysis	
					Method	Date/ID	Method	Date/ID
<b>EPA 625<sup>AGT:1</sup></b>								
4-Chlorophenylphenylether	ND	1	ug/L		625	04/14/14:204202	625	04/18/14:205766
Chrysene	ND	1	ug/L		625	04/14/14:204202	625	04/18/14:205766
Dibenzo(a,h)anthracene	ND	1	ug/L		625	04/14/14:204202	625	04/18/14:205766
Di-n-butylphthalate	ND	2	ug/L		625	04/14/14:204202	625	04/18/14:205766
1,2-Dichlorobenzene	ND	1	ug/L	600	625	04/14/14:204202	625	04/18/14:205766
1,3-Dichlorobenzene	ND	1	ug/L		625	04/14/14:204202	625	04/18/14:205766
1,4-Dichlorobenzene	ND	1	ug/L	5	625	04/14/14:204202	625	04/18/14:205766
3,3'-Dichlorobenzidine	ND	2	ug/L		625	04/14/14:204202	625	04/18/14:205766
2,4-Dichlorophenol	ND	2	ug/L		625	04/14/14:204202	625	04/18/14:205766
Diethylphthalate	ND	1	ug/L		625	04/14/14:204202	625	04/18/14:205766
2,4-Dimethylphenol	ND	2	ug/L		625	04/14/14:204202	625	04/18/14:205766
Dimethylphthalate	ND	1	ug/L		625	04/14/14:204202	625	04/18/14:205766
4,6-Dinitro-2-methylphenol	ND	1	ug/L		625	04/14/14:204202	625	04/18/14:205766
2,4-Dinitrophenol	ND	5	ug/L		625	04/14/14:204202	625	04/18/14:205766
2,4-Dinitrotoluene	ND	1	ug/L		625	04/14/14:204202	625	04/18/14:205766
2,6-Dinitrotoluene	ND	1	ug/L		625	04/14/14:204202	625	04/18/14:205766
Di-n-octylphthalate	ND	1	ug/L		625	04/14/14:204202	625	04/18/14:205766
Fluoranthene	ND	1	ug/L		625	04/14/14:204202	625	04/18/14:205766
Fluorene	ND	1	ug/L		625	04/14/14:204202	625	04/18/14:205766
Hexachlorobenzene	ND	1	ug/L	1	625	04/14/14:204202	625	04/18/14:205766
Hexachlorobutadiene	ND	1	ug/L		625	04/14/14:204202	625	04/18/14:205766
Hexachlorocyclopentadiene	ND	1	ug/L	50	625	04/14/14:204202	625	04/18/14:205766
Hexachloroethane	ND	1	ug/L		625	04/14/14:204202	625	04/18/14:205766
Indeno(1,2,3-c,d)pyrene	ND	1	ug/L		625	04/14/14:204202	625	04/18/14:205766
Isophorone	ND	1	ug/L		625	04/14/14:204202	625	04/18/14:205766
Naphthalene	ND	1	ug/L		625	04/14/14:204202	625	04/18/14:205766
Nitrobenzene	ND	1	ug/L		625	04/14/14:204202	625	04/18/14:205766
2-Nitrophenol	ND	2	ug/L		625	04/14/14:204202	625	04/18/14:205766
4-Nitrophenol	ND	2	ug/L		625	04/14/14:204202	625	04/18/14:205766
N-Nitrosodimethylamine	ND	2	ug/L		625	04/14/14:204202	625	04/18/14:205766
N-Nitrosodiphenylamine	ND	1	ug/L		625	04/14/14:204202	625	04/18/14:205766
N-Nitrosodi-n-propylamine	ND	1	ug/L		625	04/14/14:204202	625	04/18/14:205766
Pentachlorophenol	ND	2	ug/L		625	04/14/14:204202	625	04/18/14:205766
Phenanthrene	ND	1	ug/L		625	04/14/14:204202	625	04/18/14:205766
Phenol	ND	1	ug/L		625	04/14/14:204202	625	04/18/14:205766
Pyrene	ND	1	ug/L		625	04/14/14:204202	625	04/18/14:205766
Pyridine	ND	10	ug/L		625	04/14/14:204202	625	04/18/14:205766
1,2,4-Trichlorobenzene	ND	1	ug/L	5	625	04/14/14:204202	625	04/18/14:205766

May 2, 2014  
Description : Effluent

Lab ID : CC 1481152-001  
Customer ID : 8-49

**Sample Result - Organic**

Constituent	Result	PQL	Units	MCL/AL	Sample Preparation		Sample Analysis	
					Method	Date/ID	Method	Date/ID
<b>EPA 625<sup>AGT:1</sup></b>								
2,4,6-Trichlorophenol	ND	1	ug/L		625	04/14/14:204202	625	04/18/14:205766
1,2-Diphenylhydrazine	ND	1	ug/L		625	04/14/14:204202	625	04/18/14:205766
2,4,5-Trichlorophenol	ND	2	ug/L		625	04/14/14:204202	625	04/18/14:205766
<b>EPA 625 Pest<sup>AGT:1</sup></b>								
Aldrin	ND	5	ng/L		625P	04/11/14:204133	625P	04/14/14:205423
Alpha BHC	ND	5	ng/L		625P	04/11/14:204133	625P	04/14/14:205423
Beta BHC	ND	5	ng/L		625P	04/11/14:204133	625P	04/14/14:205423
Delta BHC	ND	5	ng/L		625P	04/11/14:204133	625P	04/14/14:205423
alpha-Chlordane	ND	5	ng/L		625P	04/11/14:204133	625P	04/14/14:205423
gamma-Chlordane	ND	5	ng/L		625P	04/11/14:204133	625P	04/14/14:205423
p,p'-DDD	ND	5	ng/L		625P	04/11/14:204133	625P	04/14/14:205423
p,p'-DDE	ND	5	ng/L		625P	04/11/14:204133	625P	04/14/14:205423
p,p'-DDT	ND	5	ng/L		625P	04/11/14:204133	625P	04/14/14:205423
Dieldrin	ND	5	ng/L		625P	04/11/14:204133	625P	04/14/14:205423
Endosulfan I	ND	5	ng/L		625P	04/11/14:204133	625P	04/14/14:205423
Endosulfan II	ND	5	ng/L		625P	04/11/14:204133	625P	04/14/14:205423
Endosulfan Sulfate	ND	5	ng/L		625P	04/11/14:204133	625P	04/14/14:205423
Endrin	ND	5	ng/L	2000	625P	04/11/14:204133	625P	04/14/14:205423
Endrin Aldehyde	ND	5	ng/L		625P	04/11/14:204133	625P	04/14/14:205423
Endrin Ketone	ND	5	ng/L		625P	04/11/14:204133	625P	04/14/14:205423
Heptachlor	ND	5	ng/L	10	625P	04/11/14:204133	625P	04/14/14:205423
Heptachlor Epoxide	ND	5	ng/L	10	625P	04/11/14:204133	625P	04/14/14:205423
Lindane (Gamma BHC)	ND	5	ng/L	200	625P	04/11/14:204133	625P	04/14/14:205423
Methoxychlor	ND	5	ng/L	30000	625P	04/11/14:204133	625P	04/14/14:205423
cis_Nonachlor	ND	5	ng/L		625P	04/11/14:204133	625P	04/14/14:205423
o,p - DDD	ND	5	ng/L		625P	04/11/14:204133	625P	04/14/14:205423
o,p - DDE	ND	5	ng/L		625P	04/11/14:204133	625P	04/14/14:205423
o,p - DDT	ND	5	ng/L		625P	04/11/14:204133	625P	04/14/14:205423
trans-Nonachlor	ND	5	ng/L		625P	04/11/14:204133	625P	04/14/14:205423
Tetrachloro-m-xylene <sup>‡</sup>	44.3	9-53	%		625P	04/11/14:204133	625P	04/14/14:205423
<b>TOC<sup>AVT:14</sup></b>								
TOC	ND	0.3	mg/L		5310C	04/21/14:204248	5310C	04/21/14:205697

ND=Non-Detected. PQL=Practical Quantitation Limit. Containers: (AGT) Amber Glass TFE-Cap, (AVT) Amber VOA TFE-Cap, (DO) , (N/A) Not Applicable COC Only, (P) Plastic, (PST) Preservatives: H2SO4 pH < 2, NaOH, NaOH + Zinc Acetate, H2SO4 pH < 2, HNO3 pH < 2, HNO3 pH < 2  
<sup>‡</sup>Surrogate. \* PQL adjusted for dilution.  
MCL = Maximum Contamination Level. 2 - Secondary Standard. 3 - CDPH Notification Level. AL = Regulatory Action Level.



May 2, 2014

Lab ID : CC 1481152-001

Customer ID : 8-49

**Cambria Community Services Dist.**

P.O. Box 65

Cambria, CA 93428

Sampled On : April 7, 2014-13:45

Sampled By : B.Pfeifle

Received On : April 7, 2014-15:55

Matrix : Drinking Water

Description : Effluent

Project : Special Well Testing

**Sample Result - Radio**

Constituent	Result ± Error	MDA	Units	MCL/AL	Sample Preparation		Sample Analysis	
					Method	Date/ID	Method	Date/ID
<b>Radio Chemistry</b> <sup>P:15</sup>								
Gross Alpha	0.344 ± 1.96	3.15	pCi/L	15/5	900.0	04/22/14-07:30 2P1404487	900.0	04/23/14-13:00 2A1405882
Total Alpha Radium (226)	0.111 ± 0.309	0.446	pCi/L	3	903.0	04/21/14-14:00 2P1404469	903.0	04/22/14-08:30 2A1405794
Ra 228	0.000 ± 0.962	0.400	pCi/L	2	Ra - 05	04/22/14-20:30 2P1404537	Ra - 05	04/26/14-11:30 2A1406061

ND=Non-Detected. PQL=Practical Quantitation Limit. Containers: (AGT) Amber Glass TFE-Cap, (AVT) Amber VOA TFE-Cap, (DO) , (N/A) Not Applicable COC Only, (P) Plastic, (PST) Preservatives: H2SO4 pH < 2, NaOH, NaOH + Zinc Acetate, H2SO4 pH < 2, HNO3 pH < 2, HNO3 pH < 2 \* PQL adjusted for dilution.

MDA = Minimum Detectable Activity (Calculated at the 95% confidence level) = Data utilized by DHS to determine matrix interference.

MCL / AL = Maximum Contamination Level / Action Level. Alpha's Action Level of 5 pCi/L is based on the Assigned Value (AV).

AV = Assigned Value(Gross Alpha Result + (0.84 x Error)). CCR Section 64442: Drinking Water Compliance Note: Do the following

If Gross Alpha's (AV) exceeds 5 pCi/L run Uranium. If Gross Alpha's (AV) minus Uranium exceeds 5 pCi/L run Radium 226.

**Drinking Water Compliance:**

Gross Alpha (AV) minus Uranium is less than or equal to 15 pCi/L

Uranium is less than or equal to 20 pCi/L

Radium 226 + Radium 228 is less than or equal to 5 pCi/L

Note: Samples are held for 3-6 months prior to disposal.



May 2, 2014

Lab ID : CC 1481152-001

Customer ID : 8-49

**Cambria Community Services Dist.**

P.O. Box 65

Cambria, CA 93428

Sampled On : April 7, 2014-13:45

Sampled By : B.Pfeifle

Received On : April 7, 2014-15:55

Matrix : Drinking Water

Description : Effluent

Project : Special Well Testing

**Sample Result - Support**

Constituent	Result	PQL	Units	Note	Sample Preparation		Sample Analysis	
					Method	Date/ID	Method	Date/ID
<b>Field Test</b>								
Temperature	21.51		°C			04/07/14 13:45	2550B	04/07/14 13:45
pH (Field)	7.37		units			04/07/14 13:45	4500-H B	04/07/14 13:45
Oxidat-Reduct Potential	-65.3		mV			04/07/14 13:45	---	04/07/14 13:45
Conductivity	1858		mS/cm			04/07/14 13:45	2510B	04/07/14 13:45
Oxygen, Dissolved	7.25		mg/L			04/07/14 13:45	4500-O G	04/07/14 13:45

ND=Non-Detected. PQL=Practical Quantitation Limit. Containers: (AGT) Amber Glass TFE-Cap, (AVT) Amber VOA TFE-Cap, (DO) , (N/A) Not Applicable COC Only, (P) Plastic, (PST) Preservatives: H2SO4 pH < 2, NaOH, NaOH + Zinc Acetate, H2SO4 pH < 2, HNO3 pH < 2, HNO3 pH < 2 ‡Surrogate. \* PQL adjusted for dilution.



May 2, 2014

Lab ID : CC 1481152-002

Customer ID : 8-49

**Cambria Community Services Dist.**

P.O. Box 65  
Cambria, CA 93428

Sampled On : April 7, 2014-13:45

Sampled By : B.Pfeifle

Received On : April 7, 2014-15:55

Matrix : Drinking Water

Description : Lab Duplicate

Project : Special Well Testing

**Sample Result - Inorganic**

Constituent	Result	PQL	Units	MCL/AL	Sample Preparation		Sample Analysis	
					Method	Date/ID	Method	Date/ID
<b>Metals, Diss<sup>P:1</sup></b>								
Arsenic	ND	2	ug/L	10	200.8	04/08/14:203897	200.8	04/08/14:205020
Cadmium	ND	0.2	ug/L	5	200.8	04/08/14:203897	200.8	04/08/14:205020
Chromium	ND	1	ug/L	50	200.8	04/08/14:203897	200.8	04/08/14:205020
Iron	100	50	ug/L	300 <sup>2</sup>	200.7	04/08/14:203919	200.7	04/08/14:204998
Lead	0.7	0.5	ug/L	15	200.8	04/08/14:203897	200.8	04/08/14:205020
Manganese	7.0	0.5	ug/L	50 <sup>2</sup>	200.8	04/08/14:203897	200.8	04/08/14:205020
Mercury	ND	0.02	ug/L	2	245.1	04/22/14:204508	245.1	04/23/14:205795
Nickel	2	1	ug/L	100	200.8	04/08/14:203897	200.8	04/08/14:205020
Silica	20	--	mg/L		200.7	04/08/14:203919	200.7	04/08/14:204998
Silver	ND	1	ug/L	100 <sup>2</sup>	200.8	04/08/14:203897	200.8	04/08/14:205020
<b>Metals, Total<sup>P:15</sup></b>								
Aluminum	ND	10	ug/L	1000	200.8	04/08/14:203897	200.8	04/08/14:205020
Arsenic	ND	2	ug/L	10	200.8	04/09/14:203991	200.8	04/11/14:205275
Barium	80.0	0.2	ug/L	1000	200.8	04/08/14:203897	200.8	04/08/14:205020
Boron	0.33	0.01	mg/L		200.8	04/08/14:203897	200.8	04/08/14:205020
Cadmium	ND	0.2	ug/L	5	200.8	04/09/14:203991	200.8	04/11/14:205275
Calcium	72	1	mg/L		200.1	04/09/14:203992	200.7	04/11/14:205258
Chromium	ND	1	ug/L	50	200.8	04/09/14:203991	200.8	04/11/14:205275
Iron	150	50	ug/L	300 <sup>2</sup>	200.1	04/09/14:203992	200.7	04/11/14:205258
Lead	1.6	0.5	ug/L	15	200.8	04/09/14:203991	200.8	04/11/14:205275
Magnesium	59	1	mg/L		200.1	04/09/14:203992	200.7	04/11/14:205258
Manganese	7.0	0.5	ug/L	50 <sup>2</sup>	200.8	04/08/14:203897	200.8	04/08/14:205020
Mercury	ND	0.02	ug/L	2	245.1	04/21/14:204485	245.1	04/22/14:205797
Nickel	4	1	ug/L	100	200.8	04/09/14:203991	200.8	04/11/14:205275
Potassium	26	1	mg/L		200.1	04/09/14:203992	200.7	04/14/14:205303
Silver	ND	1	ug/L	100 <sup>2</sup>	200.8	04/09/14:203991	200.8	04/11/14:205275
Sodium	250	1	mg/L		200.1	04/09/14:203992	200.7	04/11/14:205258
Strontium	551	5	ug/L		200.1	04/09/14:203992	200.7	04/11/14:205258
Zinc	70	10	ug/L		200.8	04/08/14:203897	200.8	04/08/14:205020
<b>Wet Chemistry<sup>P:1</sup></b>								
Ammonia Nitrogen	0.3	0.2	mg/L		4500NH3B	04/15/14:204229	4500NH3G	04/16/14:205422
Alkalinity (as CaCO3)	220	10	mg/L		2320B	04/09/14:204015	2320B	04/09/14:205108
Bicarbonate	270	10	mg/L		2320B	04/09/14:204015	2320B	04/09/14:205108
Carbonate	ND	10	mg/L		2320B	04/09/14:204015	2320B	04/09/14:205108
Hydroxide	ND	10	mg/L		2320B	04/09/14:204015	2320B	04/09/14:205108

May 2, 2014  
 Description : Lab Duplicate

Lab ID : CC 1481152-002  
 Customer ID : 8-49

**Sample Result - Inorganic**

Constituent	Result	PQL	Units	MCL/AL	Sample Preparation		Sample Analysis	
					Method	Date/ID	Method	Date/ID
<b>Wet Chemistry</b> <sup>P:1</sup>								
Bromide	0.93	0.03	mg/L		300.0	04/08/14:203952	300.0	04/08/14:205031
Carbon Dioxide	11	1	mg/L		4500COC	04/08/14:203942	4500COC	04/08/14:204991
Chloride	361	5*	mg/L	500 <sup>2</sup>	300.0	04/08/14:203952	300.0	04/08/14:205031
Chlorine, Total	ND	0.1	mg/L		4500CIG	04/08/14:204823	4500CIG	04/08/14:206185
Specific Conductance	1940	1	umhos/cm	1600 <sup>2</sup>	2510B	04/09/14:203963	2510B	04/09/14:205010
Cyanide, Total	ND	0.004	mg/L	0.15	4500CNCE	04/20/14:203866	4500CNCE	04/20/14:205595
Fluoride	0.1	0.1	mg/L	2	300.0	04/08/14:203952	300.0	04/08/14:205031
Nitrate	148	2*	mg/L	45	300.0	04/08/14:203952	300.0	04/08/14:205031
Nitrite	ND	0.3	mg/L	3.3	300.0	04/08/14:203952	300.0	04/08/14:205031
Nitrogen, Total Kjeldahl	ND	1	mg/L		351.2	04/10/14:204017	EPA351.2	04/16/14:205341
Oxygen, Dissolved	6.4	0.5	mg/L		4500-O G	04/08/14:203906	5210B	04/08/14:204963
pH	7.6	--	units		4500-H B	04/08/14:203926	4500HB	04/08/14:204970
Phosphate	18	3*	mg/L		4500-P E	04/08/14:203923	4500PE	04/08/14:204968
Solids, Total Dissolved (TDS)	1110	20	mg/L	1000 <sup>2</sup>	2540CE	04/09/14:204007	2540C	04/10/14:205100
Solids, Total Suspended (TSS)	3	1	mg/L		2540D	04/09/14:203996	2540D	04/11/14:205221
Sulfate	110	2	mg/L	500 <sup>2</sup>	300.0	04/08/14:203952	300.0	04/08/14:205031
Sulfide, Total	ND	0.1	mg/L		4500S D	04/14/14:204206	4500S2	04/14/14:205321

ND=Non-Detected. PQL=Practical Quantitation Limit. Containers: (AGT) Amber Glass TFE-Cap, (AVT) Amber VOA TFE-Cap, (DO) , (N/A) Not Applicable COC Only, (P) Plastic, (PST) Preservatives: H2SO4 pH < 2, NaOH, NaOH + Zinc Acetate, H2SO4 pH < 2, HNO3 pH < 2, HNO3 pH < 2  
 ‡Surrogate. \* PQL adjusted for dilution.  
 MCL = Maximum Contamination Level. 2 - Secondary Standard. 3 - CDPH Notification Level. AL = Regulatory Action Level.