Farhad, Mohammad@Waterboards

From: Mullins, Daniel@CDCR <Daniel.Mullins@cdcr.ca.gov>
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To: CentralValleySacramento
Cc: Farhad, Mohammad@Waterboards; Bettencourt, Miles (Terry)@CDCR; Stanley, Jeff@CDCR
Subject: Salinity Evaluation and Salintiy Minimization Plan
Attachments: DVI- SALINITY Report 2015.pdf

Attached is the SALINITY EVALUATION AND SALINITY MINIMIZATION PLAN
If you have any questions fell free to call

NPDES #CA0078093
Facility ID 5B390100001

Daniel G Mullins
Water & Wastewater Treatment Plant Supervisor
Deuel Vocational Institution
23500 kasson Rd Tracy CA 95376
Office-(209) 835-4141 x5897
Fax-(209) 830-3941

CALIFORNIA DEPARTMENT OF CORRECTIONS AND REHABILITATION

FACILITY PLANNING, CONSTRUCTION AND MANAGEMENT DIVISION
DESIGN AND ENVIRONMENTAL SERVICES AND STANDARDS BRANCH
DESIGN SERVICES

SALINITY EVALUATION AND SALINITY MINIMIZATION PLAN

DEUEL VOCATIONAL INSTITUTION
TRACY, CALIFORNIA

January 2015

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1. Introduction

Regional Water Quality Control Board (RWQCB), Central Valley Region issued Waste Discharge Requirement (WDR) No. R5-2014-0014 on February 2014. Provision C-3-c of the WDR requires that the discharger to prepare a Salinity Evaluation and Minimization plan to identify and address sources of salinity from the Facility. The salinity in the discharge shall be limited to meet the water quality objectives of the Bay-Delta Plan for Electrical Conductivity (EC) of the South Delta in the vicinity of the discharge. On June 1, 2011, the Superior Court for Sacramento County entered a judgment and peremptory writ of mandate in the matter of City of Tracy v. State Water Resources Control Board (Case No. 34-2009-8000-392-CU-WM-GDS), on the ruling that the South Delta salinity objectives shall not apply to the City of Tracy and other municipal dischargers pending reconsideration of the South Delta salinity objectives and adoption of a proper program of implementation that includes municipal dischargers. In response to the Court Order, the State Water Board is currently considering new salinity and flow objectives in the South Delta that will be applicable to the City of Tracy.

The new salinity objectives may result in the need for the changes to the salinity requirements of the order R5-2014-0014. Therefore, the order may be reopened to modify salinity requirements, as appropriate, in light of the changes to the Bay-Delta Plan. When this happens, a revise salinity evaluation and minimization plan will be prepared in an effort to meet the new Bay-Delta Plan water quality objectives for EC for the South Delta.

This report focuses on the providing information about salinity of raw water to treated effluent being discharged to Deuel Drain at Discharge Point 001, based on the monitoring data gathered during last two years of operation, and does not address any effort to meet any EC limitation.

1.1 Scope of the Study

The objective of this Salinity Plan is to:

1. Present information and data relevant to salinity.
2. Provide data on the wastewater and source water salinity.

2. Water Source

The DVI receives its water supply from groundwater. There are four operating water supply wells on the DVI property. The depth and capacity of the wells are as follows:

Well	Depth (Feet)	Year of Construction	Present Capacity (gpm)
4	490	1953	450
5	500	1960	350
6	615	1971	450
9	690	2007	750

The well water has high level of Total Dissolved Solids (TDS), chloride, manganese, and iron which result the high EC. Table 2-1 shows monthly EC of raw well water for last two years.

Table 2-1 Water Quality of Source Water, EC µmhos/cm

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Ave.
2013	3500	3990	3980	3870	4085	4220	4200	4600	3800	3700	4250	4200	3700
2014	3600	3500	3500	3300	3600	3500	3700	3800	3900	3900	3500	N/A	3600

2.1 Water Treatment, Storage and Distribution

The groundwater treatment facilities include the following major processes:

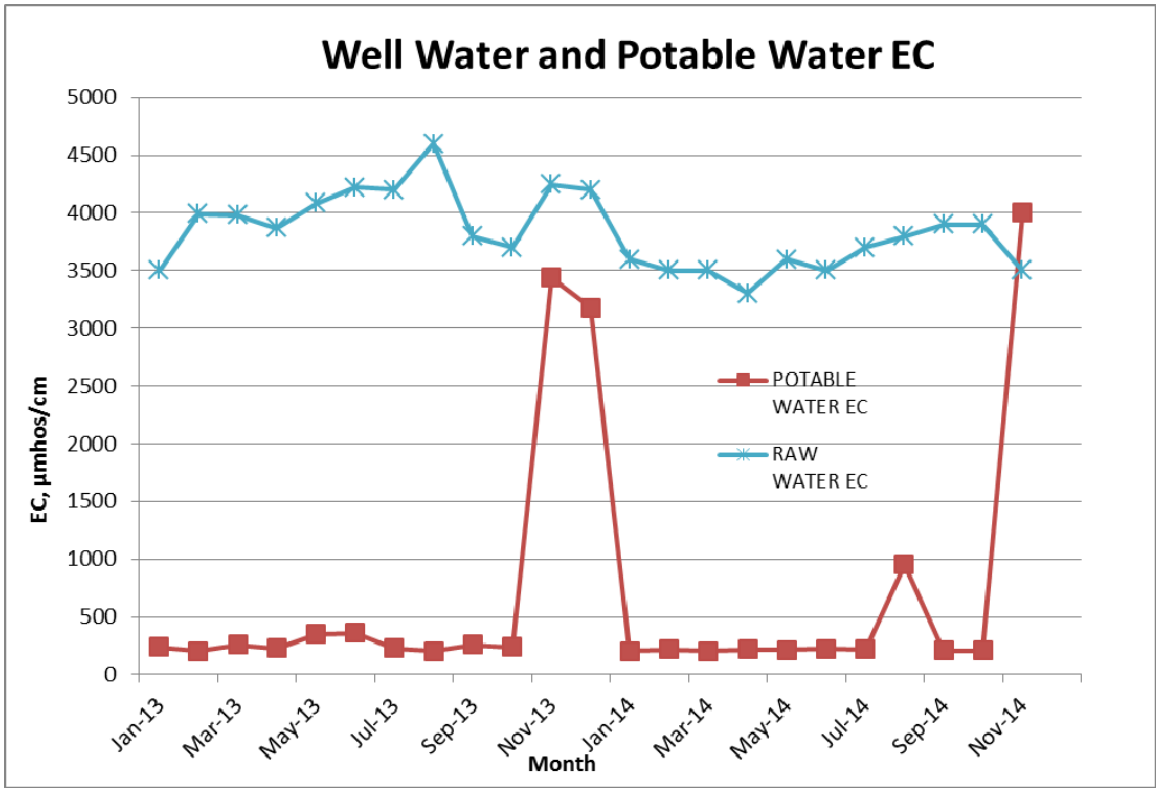
- Sand separators
- Bag filters
- Cartridge filters
- Reverse Osmosis (RO) membrane filtration
- Brine Concentrator
- Evaporation Ponds

Water from the wells is first pumped through sand separators to remove the bulk of any sand from the well water. From the sand separator, the water goes through additional pretreatment consisting of bag filters and then fine cartridge filters, then water pumps through RO membrane filtration for the removal of TDS, manganese and iron. RO plant removes brine from the raw water, concentrate brine and discharge to four evaporation basins. This process reduces the water EC by ninety five percent. After RO treatment, the water is chlorinated as it is pumped into 1 million gallon above ground steel storage tank. Three pressure booster pumps are used to pump water to the distribution system. Additional storage of treated water is provided by a 250,000 gallon elevated steel storage tank.

Table 2-1 Water Quality of Treated Water, EC µmhos/cm

	Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
RO Water	2013	197	195	216	1111	2777	218	261	202	220	210	4250	3685
	2014	220	200	205	190	447	195	204	207	203	1807	3375	N/A
Potable Water	2013	239	203	256	229	351	362	229	201	258	236	3440	3180
	2014	199	216	202	215	213	220	219	955	207	207	4001	N/A

Figure 3-1 Water Quality of Source Water, EC µmhos/cm



The difference between RO and potable water EC depends on the volume of water passed through the RO system, and when RO system is not in service the EC of potable water raise significantly.

3. Wastewater Treatment Facility

The DVI permit effluent flow is 0.62 MGD, average dry weather flow. Wastewater treatment facility currently produces an average of approximately 0.5 MGD effluent with an average daily flow in the peak month of 0.6 MGD.
The upgraded treatment system consists of mechanical bar screening, grit removal, two drum screens, biological treatment using anoxic and aeration basins including nitrification and denitrification, four membrane bioreactor (MBR) filtration tanks, ultraviolet light (UV) disinfection, and three cooling towers.

Table 3-1 Wastewater Flow, MGD

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Ave.
2013	0.43	0.40	0.44	0.50	0.52	0.49	0.47	0.53	0.53	0.48	0.53	0.46	0.50
2014	0.45	0.49	0.52	0.53	0.50	0.52	0.49	0.57	0.53	0.48	0.44	N/A	0.50

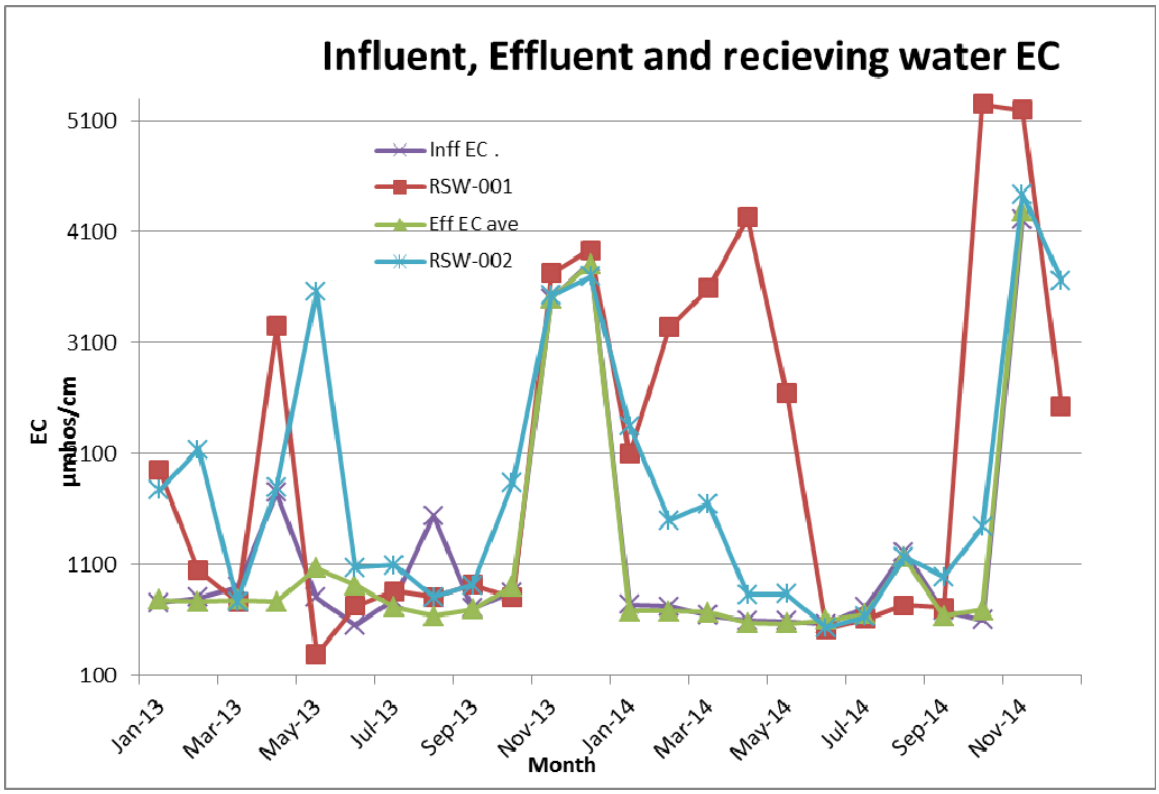
4. Effluent Salinity and Receiving Water

DVI monitoring the effluent salinity of the samples from the influent into the wastewater facility, effluent from the facility, Dual Drain at 3800 feet upstream (RSW-001) and 450 feet downstream (RSW-002) of the point of discharge point 001. Table 4-1 shows salinity of the Influent, effluent, Dual Drain upstream and downstream of the discharge point for year 2013 and 2014.

Table 4-1 Wastewater Influent, Effluent and Deuel Drain, EC µmhos/cm

Month/Year	Influent EC, Average, µmhos/cm	Effluent EC, Average, µmhos/cm	RSW-001 EC, Average, µmhos/cm	RSW-002 EC, Average, µmhos/cm
Jan-13	754	782	1951	1775
Feb-13	805	766	1051	2138
Mar-13	902	783	769	769
Apr-13	1751	769	3250	1797
May-13	803	1072	293	3560
Jun-13	556	915	732	1077
Jul-13	790	719	864	1098
Aug-13	1544	641	809	808
Sep-13	708	696	920	915
Oct-13	853	903	805	1838
Nov-13	3500	3500	3730	3530
Dec-13	3824	3810	3940	3700
Jan-14	741	683	2104	2350
Feb-14	727	682	3240	1502
Mar-14	645	671	3590	1648
Apr-14	598	573	4230	833
May-14	590	572	2650	836
Jun-14	567	600	522	532
Jul-14	721	653	613	632
Aug-14	1215	1164	736	1171
Sep-14	688	638	713	992
Oct-14	601	691	5250	1440
Nov-14	4210	4290	5200	4440
Dec-14	N/A	N/A	2530	3660

Figure 4-1 Water Quality of Influent, Effluent, and Receiving Water, EC µmhos/cm



5. Conclusion

The last two year's data shows that when the RO system was online the salinity of effluent is about ninety five percent lower than salinity of the source water and the other times was about twenty percent lower. November 2014 was the only time with effluent E higher than raw water due to RO was out of service.

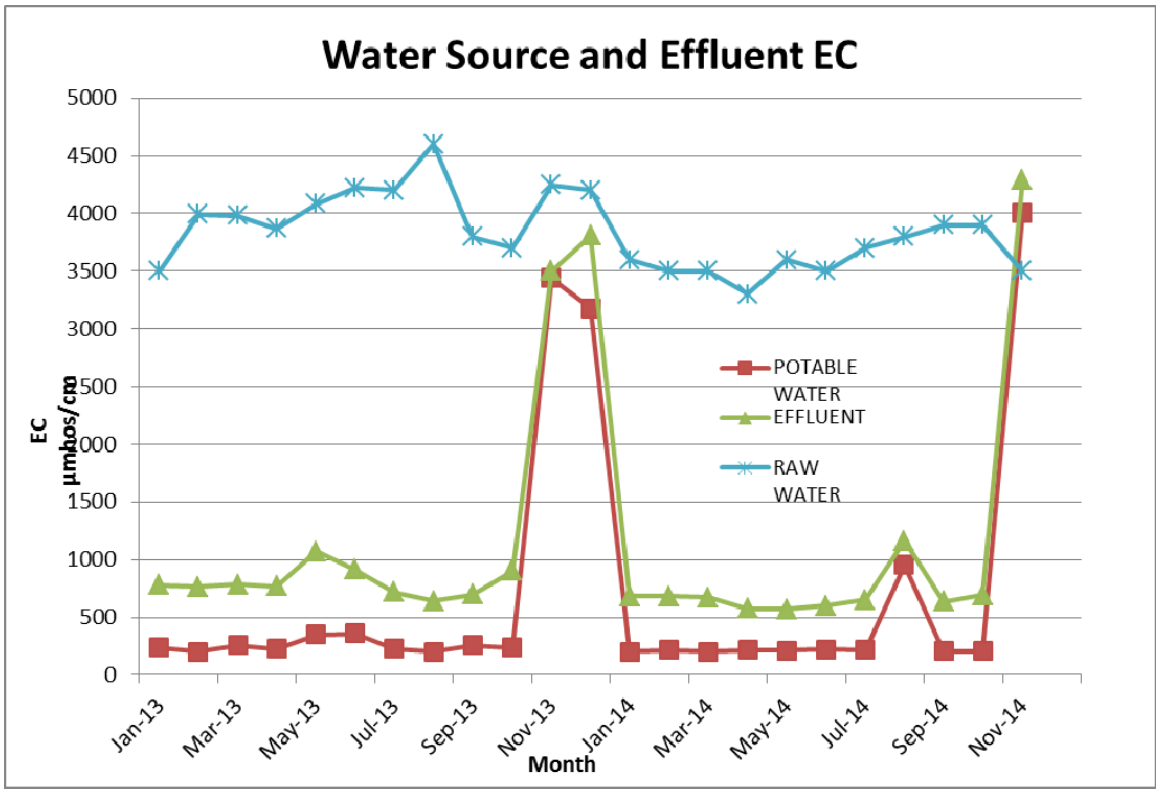



Figure 5-1 Water Quality of Source Water and Effluent, EC µmhos/cm