



EDMUND G. BROWN JR.
GOVERNOR



MATTHEW RODRIGUEZ
SECRETARY FOR
ENVIRONMENTAL PROTECTION

State Water Resources Control Board
Division of Drinking Water

March 11, 2016

System No. 3910800

Certified Mail Return/Receipt
No. 7012 3460 0003 1113 2325

Fred Cordano, Associate Director
California Department of Corrections and Rehabilitation
9838 Old Placerville Road, Suite B
Sacramento, CA 95827

TRANSMITTAL OF COMPLIANCE ORDER NO. 01-10-16R-001

Dear Mr. Cordano:

The State Water Resources Control Board (Water Board), Division of Drinking Water, has issued the Department of Corrections and Rehabilitation (for the Deuel Vocational Institution public water system) a compliance order, which is attached.

Please contact Bhupinder Sahota, Stockton District Engineer, at (209) 948-3881, or Dave Remick at (209) 948-3878, if you have any questions.

Sincerely,

A handwritten signature in black ink, appearing to read "Richard L. Hinrichs".

Richard L. Hinrichs, P.E., Chief
Northern California Section
State Water Resources Control Board
Division of Drinking Water

Attachments:

Attachment A – Citation No. 01-10-15C-002

Attachment B – DVI Corrective Action Plan Letter (dated 11/30/15)

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3 **CALIFORNIA**
4 **STATE WATER RESOURCES CONTROL BOARD**
5 **DIVISION OF DRINKING WATER**

6 TO: Deuel Vocational Institution
7 ATTN: Fred Cordano, Associate Director
8 State of California Department of Corrections and Rehabilitation
9 9838 Old Placerville Road, Suite B
10 Sacramento, CA 95827

11 **COMPLIANCE ORDER NO. 01-10-16R-001**
12 **FOR**
13 **VIOLATION OF HEALTH AND SAFETY CODE SECTION 116655 (a)(1)**
14 **AND THE SECONDARY DRINKING WATER STANDARDS FOR TOTAL**
15 **DISSOLVED SOLIDS, SPECIFIC CONDUCTANCE, CHLORIDE, AND**
16 **MANGANESE**

17 **Dated March 11, 2016**

18 The State Water Resources Control Board (hereinafter "Water Board"), acting
19 by and through its Division of Drinking Water (hereinafter "Division") and the
20 Deputy Director for the Division (hereinafter "Deputy Director"), hereby issues
21 this compliance order (hereinafter "Order") pursuant to Section 116655 of the
22 California Health and Safety Code (hereinafter "CHSC") to the California
23 Department of Corrections and Rehabilitation (CDCR), Deuel Vocational
24 Institution (hereinafter "DVI") for violation of CHSC section 116555(a)(1) and
25 Title 22, California Code of Regulations (hereinafter "CCR"), Section 64449.
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APPLICABLE AUTHORITIES

CHSC, Section 116555(a)(1-3) states in relevant part:

“116555.

(a) Any person who owns a public water system shall ensure that the system does all of the following:

- (1) Complies with primary and secondary drinking water standards.
- (2) Will not be subject to backflow under normal operating conditions.
- (3) Provides a reliable and adequate supply of pure, wholesome, healthful, and potable water.”

CHSC, Section 116655 provides:

“116655.

(a) Whenever the department determines that any person has violated or is violating this chapter, or any permit, regulation, or standard issued or adopted pursuant to this chapter, the director may issue an order doing any of the following:

- (1) Directing compliance forthwith.
- (2) Directing compliance in accordance with a time schedule set by the department.
- (3) Directing that appropriate preventive action be taken in the case of a threatened violation.

(b) An order issued pursuant to this section may include, but shall not be limited to, any or all of the following requirements:

- (1) That the existing plant, works, or system be repaired, altered, or added to.
- (2) That purification or treatment works be installed.
- (3) That the source of the water supply be changed.
- (4) That no additional service connection be made to the system.
- (5) That the water supply, the plant, or the system be monitored.
- (6) That a report on the condition and operation of the plant, works, system, or water supply be submitted to the department.

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3 Title 22, CCR, Section 64449 (hereinafter "Section 64449"), states in
4 relevant part:

5 "64449.

6 (a) The secondary MCLs shown in Tables 64449-A and 64449-B shall not
7 be exceeded in the water supplied to the public by community water
8 systems

9 **Table 64449-A**
10 **Secondary Maximum Contaminant Levels**
11 **"Consumer Acceptance Contaminant Levels"**

<i>Constituents</i>	<i>Maximum Contaminant Levels/Units</i>
Aluminum	0.2 mg/L
Color	15 Units
Copper	1.0 mg/L
Foaming Agents (MBAS)	0.5 mg/L
Iron	0.3 mg/L
Manganese	0.05 mg/L
Methyl- <i>tert</i> -butyl ether (MTBE)	0.005 mg/L
Odor-Threshold	3 Units
Silver	0.1 mg/L
Thiobencarb	0.001 mg/L
Turbidity	5 Units
Zinc	5.0 mg/L

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19 **Table 64449-B**
20 **Secondary Maximum Contaminant Levels**
21 **"Consumer Acceptance Contaminant Level Ranges"**

<i>Constituent, Units</i>	<i>Maximum Contaminant Levels Ranges</i>		
	<i>Recommended</i>	<i>Upper</i>	<i>Short Term</i>
Total Dissolved Solids, mg/L	500	1,000	1,500
Specific Conductance, uS/cm	900	1,600	2,200
Chloride, mg/L	250	500	600
Sulfate, mg/L	250	500	600

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25 (b) Each community water system shall monitor its groundwater sources or
26 distribution system entry points representative of the effluent of source
27 treatment every three years and its approved surface water sources or
distribution system entry points representative of the effluent of source
treatment annually for the following:

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(1) Secondary MCLs listed in Tables 64449-A and 64449-B; and

(2) Bicarbonate, carbonate, and hydroxide alkalinity, calcium, magnesium, sodium, pH, and total hardness.

(c) If the level of any constituent in Table 64449-A exceeds an MCL, the community water system shall proceed as follows:

(1) If monitoring quarterly, determine compliance by a running annual average of four quarterly samples;

(2) If monitoring less than quarterly, initiate quarterly monitoring and determine compliance on the basis of an average of the initial sample and the next three consecutive quarterly samples collected;

(3) If a violation has occurred (average of four consecutive quarterly samples exceeds an MCL), inform the Department when reporting pursuant to Section 64469;

(4) After one year of quarterly monitoring during which all the results are below the MCL and the results do not indicate any trend toward exceeding the MCL, the system may request the Department to allow a reduced monitoring frequency.

(d) For the constituents shown on Table 64449-B, no fixed consumer acceptance contaminant level has been established.

(1) Constituent concentrations lower than the Recommended contaminant level are desirable for a higher degree of consumer acceptance.

(2) Constituent concentrations ranging to the Upper contaminant level are acceptable if it is neither reasonable nor feasible to provide more suitable waters.

(3) Constituent concentrations ranging to the short term contaminant level are acceptable only for existing community water systems on a temporary basis pending construction of treatment facilities or development of acceptable new water sources.

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STATEMENT OF FACTS

According to information provided to the Division, DVI operates and maintains the DVI public water system that provides domestic water to approximately 2,500 inmates, a staff of about 1,000 (per the 2014 Annual Report to the Drinking Water Program), and the dairy facilities, which are operated by CDCR at DVI. The water system is operated under authority of a water supply permit (No. 01-89-011) granted by the Division (successor to the California Department of Public Health) to DVI on November 1, 1989, and amended February 1, 2010, (No. 03-10-10PA-005) to add the Reverse Osmosis (hereinafter "RO") Water Treatment Plant and associated Brine Concentrator System (BCS) for the treatment/removal of secondary contaminants. The facilities include a large number of prison cells, residential housing for some staff members, a wastewater treatment plant, a dairy and milk processing plant, and vocational training facilities for the inmates. The water system is a community public water system as defined in CHSC, Section 116275.

The DVI water system uses only groundwater as a source of supply. There are currently three permitted wells that are used in conjunction with the RO treatment facility. However one of the wells (Well No. 5) had been out of service from mid-2013 to mid-January 2016, according to DVI, due to contractual and bidding difficulties for required mechanical repairs. The water for the RO treatment plant during the period of mid-2013 through mid-January 2016 was produced from Wells Nos. 4 and 9, which are located on DVI property. A fourth well (Well No. 6) is maintained as an irrigation well but

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is isolated from the potable system. In mid-January 2016, repairs were completed to Well No. 5 and the well has been returned to service.

Title 22, CCR, Division 4, Chapter 15, Article 16 established secondary drinking water standards and also monitoring and reporting requirements for the secondary standards. Community water systems must comply with the secondary MCLs in Tables 64449-A and 64449-B.

The RO treatment plant had been out of service from mid-October 2014 until April 23, 2015. On October 18, 2014, the facility was required to shut down due to overdue maintenance. The BCS had scaled the evaporator tubes to a point that the BCS was unable to keep up with RO concentrate flow. The initial down time was set at about two (2) weeks while the BCS was hydro blasted and cleaned. Once the BCS cleaning process was completed, heating/seeding of the evaporator for restart began October 25, 2014. This process generally takes approximately three days. DVI began to restart the pump on October 27, 2014. It was observed that the evaporator level was above operational parameters. After troubleshooting the issue, plant operators found seal water was leaking through the recirculation pump seal into the evaporator body raising the level and flushing the seed material out of the evaporator seal leg. This condition did not allow the appropriate crystals to accumulate in the evaporator body and the restart was abandoned.

According to information provided to the Division by DVI, DVI procured a rebuilt pump seal and installed it in late December 2014 and attempted to

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restart the pump on December 24, 2014, but that effort failed. DVI facility staff applied seal water to the pump and filled the evaporator to test the pump operations. The seal did not hold and began leaking seal water out the backside. The decision was made not to proceed with the restart to minimize any additional damage that might have occurred due to the seal leaking.

DVI procured parts needed to rebuild the pump and the RO plant was restarted on April 23, 2015. Due to the extended shut down periods, DVI was in violation of secondary standards for TDS (Total Dissolved Solids), EC (Specific Conductance), Manganese, and Chloride. RO treatment plant outages have occurred before, sometimes due to planned maintenance and other times due to mechanical problems. According to DVI the outages have all been consistently related to the BCS.

According to information provided to the Division by DVI, since the RO plant was permitted in February 2010, it has not operated during all or part of the following months:

From April 2010 until February 2012: The RO system was out of service initially due to severe corrosion and cracking discovered in components of the BCS. The length of the outage was primarily due to disagreements between the various entities involved in the design and construction of the BCS regarding the causes of the problems and who was responsible.

March 2012: BCS was out of service for a planned inspection.

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May through June 2012: BCS was out of service for cleaning. Heat exchanger problem was discovered during restart, which delayed restart until problem was remedied.

November 2012: BCS was out of service for scheduled cleaning for the first half of November.

November through most of December 2013: BCS was out of service for scheduled cleaning. Heat exchanger plates were changed out for thicker titanium plates.

Mid October 2014 through April 23, 2015: BCS out of service as detailed previously in Statement of Facts.

The RO treatment process is intended to reduce total dissolved solids (TDS), chloride, manganese, and iron from the well water and to reduce the specific conductance (EC) levels. During the times that the RO treatment system is out of service, the water receives no treatment other than bag filtration and chlorination prior to delivery to the one million gallon storage tank.

The following table shows the pre-treatment levels of the constituents, other than iron, that the RO treatment removes/reduces in the three system wells. As noted previously, Well No. 5 had been out of service pending mechanical repairs but was returned to service in mid-January 2016.

Table 1 – Raw Well TDS, Chloride, Manganese, & EC Levels

Well Number	TDS (mg/l) (Trigger=1,000 mg/l)	Chloride (mg/l) (Trigger=500 mg/l)	Manganese (ug/l) (MCL=50 ug/l)	Specific Conductance (Trigger=1,600 uS/cm)
4	*1,200 (10/13) **1,600 (10/14)	380 (10/13) *560 (10/14)	*360 (10/13) *580 (10/14)	*1,600 (10/13) **2,400 (10/14)
9	**2,900 (10/13) **3,000 (10/14)	**1,300 (10/13) **1,400 (10/14)	*690 (10/13) *410 (10/14)	**4,200 (10/13) **4,700 (10/14)
5 Previously Out of Service	*1,360 (8/12) **1,500 (7/13)	**617 (8/12) **610 (7/13)	*605 (11/12) *520 (7/13)	**2,210 (11/12) **2,400 (7/13)

*Exceeds MCL or Trigger (Upper Contaminant Level) & **Exceeds Short Term Level

As can be seen from the table above, the water quality of all three wells is very poor and monitoring confirms that the quality has generally deteriorated over time, with most of the above-listed constituents showing clear increases in concentration.

Table 2 – Water Distributed without Treatment (TDS, Chloride, Manganese, & EC Levels)

	TDS (mg/l) (Trigger=1,000 mg/l)	Chloride (mg/l) (Trigger=500 mg/l)	Manganese (ug/l) (MCL=50 ug/l)	Specific Conductance (Trigger=1,600 uS/cm)
Combined Treated	**2,600 (10/23/14) **2,500 (10/28/14) **2,600 (12/16/14) **2,600 (12/22/14)	**1,100 (10/23/14) **1,000 (10/28/14) **1,200 (12/16/14) **1,200 (12/22/14)	*760 (10/23/14) *550 (10/28/14) *670 (12/16/14) *730 (12/22/14)	**3,700 (10/23/14) **3,100 (10/28/14) **4,200 (12/16/14) **4,000 (12/22/14)

*Exceeds MCL or Trigger (Upper Contaminant Level) & **Exceeds Short Term Level

Table 2 shows the monitoring results for October 2014 and December 2014 of the combined well flow, which is the quality of the combined Wells Nos. 4 and 9 that was pumped into the distribution system without RO treatment. The dates of the monitoring were for certified laboratory analyses but is representative of the water that was distributed for the entire period since the RO had been out of service, which was from mid-October 2014 through April 23, 2015. For clarification, as stated previously, with the RO treatment system out of service, the water received no treatment other than bag

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filtration and chlorination prior to delivery to the one million gallon storage tank.

Due to the violations CHSC Section 116555 and Secondary Drinking Water Standards for TDS, EC, Chloride and Manganese, the Division issued Citation No. 01-10-15C-002 (Attachment A) on March 2, 2015, which contained a number of directives. Directive 5 required preparation of a Corrective Action Plan (CAP) identifying improvements to the Reverse Osmosis and Brine Concentrator treatment system designed to correct the water quality problem (violation of the Secondary MCLs and Maximum Contaminant Level Ranges) and ensuring that the DVI Water System delivers water to consumers that reliably and consistently meets all Primary and Secondary Drinking Water Standards. Part 1 of the Corrective Action Plan was required to include a plan and time schedule for making operational improvements to the Reverse Osmosis and Brine Concentrator treatment system. Part 2 of the Corrective Action Plan was required to include a plan and time schedule for completion of each of the phases of the project, including but not limited to, planning, design, construction, and startup, and a date by which the DVI Water System will be in compliance with the Secondary Drinking Water Standards.

CDCR complied with the requirement to prepare and submit the CAP described above. Part 2 of the CAP was due by November 30, 2015. CDCR submitted a Final Report (November 23, 2015) entitled Deuel Vocational Institute Water Treatment Plant Reliability Study, which was prepared by Dewberry Engineers. A letter (Attachment B) dated November 30, 2015 from CDCR was a follow-up to the Dewberry report, which provided clarification of

1
2 the proposed project and included timelines for the various phases of the
3 project.

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5 In summary, the two major phases of the project are as follows:

6 Phase I: Repairs and/or reconstruction of the RO brine ponds, which have
7 been out of service since October 2014 due to leakage of the liners. The
8 brine pond portion of the CAP includes Brine Pond Liner Design followed by
9 Brine Pond Repair Contract, and finally the Brine Pond Construction phase.

10
11 Phase II: Vibratory Shear Enhanced Process (VSEP) System development.
12 The Dewberry Engineers study determined that a two-stage VSEP
13 membrane system would provide reliability and redundancy to the RO
14 system. The VSEP system rapidly vibrates the RO membranes to prevent
15 formation of mineral scale on the membrane surface. Saturated minerals
16 crystallize in the bulk solution; however, the rapid vibration maintains
17 saturated minerals in suspension. VSEP also uses anti-scalant and pH
18 adjustment to inhibit precipitation of the saturated minerals in the process.
19 The VSEP process combined with pH suppression to 4.5, anti-scalant
20 addition, and concentrate recycling can reduce the brine volume by 85 to 95
21 percent.

22
23 The VSEP system would replace the current Brine Concentrator and be used
24 as a second stage treatment after the existing RO membrane treatment train
25 to reduce the volume of liquid brine that is discharged to the ponds for
26 evaporation. The VSEP system will consist of a first stage with nine (9)
27 standard VSEP modules operating at 500 psi and the second stage will have

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2 three (3) high pressure modules operating at 1,000 psi. Each stage will
3 operate at 88 percent recovery and yield a combined total VSEP recovery of
4 92.5 percent as clean permeate. The permeate from the VSEP system will
5 be combined with the existing RO system permeate.
6

7 **DETERMINATIONS**

8 Based on the above Statement of Facts, the Division has determined that the
9 DVI Water System has violated CHSC, Section 116555 and Section 64449 in
10 that the water produced by DVI Wells Nos. 4 & 9, or the combined water
11 supplied to the Water System during the fourth quarter of 2014, exceeded the
12 Secondary Drinking Water Standards MCLs and Maximum Contaminant Level
13 Ranges as shown in Table 1 and Table 2 above, and further has determined
14 that said violation had continued from mid-October 2014 through April 23,
15 2015.
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18 **DIRECTIVES**

19 DVI is hereby directed to take the following actions:
20

- 21
- 22 1. On or before September 30, 2016, complete Phase I – Brine Pond Liner
23 Design.
 - 24 2. On or before September 30, 2017, complete Phase I – Brine Pond
25 Repair Contract Development.
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- 27

- 1
2 3. On or before June 30, 2018, complete Phase I – Brine Pond
3 Construction
- 4
5 4. On or before May 30, 2017, complete Phase II – VSEP Design.
- 6
7 5. On or before January 31, 2019, complete Phase II – VSEP Contract
8 Development.
- 9
10 6. On or before June 30, 2020, complete Phase II – VSEP Construction.
- 11
12 7. On or before **June 30, 2016**, and every three months thereafter, submit
13 a report to the Division, showing actions taken during the previous
14 calendar quarter (or three months) to comply with the Directives and the
15 status of each of the Directives Nos. 1 through 6.
- 16
17 8. DVI shall maintain the ability to provide an alternate source(s) of
18 drinking water for inmates and staff for all future outages that exceed 7
19 days.
- 20
21 9. In the event of future RO treatment plant outages, DVI shall notify the
22 Division's Stockton District office within 24 hours by phone or email to
23 inform the District Engineer of the cause of the outage, the expected
24 duration of the outage, and if the outage is likely to exceed 7 days.
- 25
26 10. Notify the Division in writing no later than five (5) days prior to the
27 deadline for performance of any Directive set forth herein if DVI
anticipates it will not timely meet such performance deadline.

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11. On or before February 19, 2016, submit a written response to the Division indicating its agreement to comply with the directives of this Compliance Order.

All submittals required by this Order shall be addressed to:

Bhupinder S. Sahota, Senior Sanitary Engineer
State Water Resources Control Board
Division of Drinking Water, Stockton District
31 East Channel Street, Room 270
Stockton, California 95202

As used in this Order, the date of issuance shall be the date of this Order; and the date of service shall be the date of service of this Order, personal or by certified mail, on the Water System.

The Division reserves the right to make such modifications to this Order and/or to issue such further order(s) as it may deem necessary to protect public health and safety. Such modifications may be issued as amendments to this Order and shall be deemed effective upon issuance.

Nothing in this Order relieves Water System of its obligation to meet the requirements of the California SDWA, or any regulation, standard, permit or order issued thereunder.

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PARTIES BOUND

This Order shall apply to and be binding upon Water System, its owners, shareholders, officers, directors, agents, employees, contractors, successors, and assignees.

SEVERABILITY

The Directives of this Order are severable, and DVI Water System shall comply with each and every provision hereof, notwithstanding the effectiveness of any other provision.

FURTHER ENFORCEMENT ACTION

The California SDWA authorizes the Board to: issue a citation with assessment of administrative penalties to a public water system for violation or continued violation of the requirements of the California SDWA or any regulation, permit, standard, citation, or order issued or adopted thereunder including, but not limited to, failure to correct a violation identified in a citation or compliance order. The California SDWA also authorizes the Board to take action to suspend or revoke a permit that has been issued to a public water system if the public water system has violated applicable law or regulations or has failed to comply with an order of the Board; and to petition the superior court to take various enforcement measures against a public water system that has failed to

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comply with an order of the Board. The Board does not waive any further enforcement action by issuance of this Order.

Richard L. Hinrichs

3/11/2016
Date

Richard L. Hinrichs, P.E., Chief
Northern California Section
State Water Resources Control Board
Division of Drinking Water



Certified Mail No. 7012 3460 0003 1113 2325

cc: J. Price, Warden
State of California Department of Corrections and Rehabilitation
Deuel Vocational Institution
P.O. Box 400
Tracy, CA 95376

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