

INFORMATION SHEET

ORDER NO. R5-2015-XXXX
CALIFORNIA RESOURCES PRODUCTION CORPORATION AND
NORTH KERN WATER STORAGE DISTRICT
OIL FIELD PRODUCED WATER RECLAMTION PROJECT
KERN COUNTY

Background

The California Resources Production Corporation (CRC) generates oil field produced water (produced water) from about 850 oil production wells in the Kern Front Oil Field. The produced water is treated to reduce the oil and grease content at CRCs Section 23 treatment facility. The North Kern Water Storage District (District) and CRC are proposing to use produced water from CRC's Kern Front Oil Field leases for crop irrigation and groundwater recharge purposes within the District. CRC and the District submitted a Report of Waste Discharge (RWD) in support of the proposed project in March 2015.

The District was formed in 1935 to manage ground-water storage underlying the District". In 1952, the District acquired the right in perpetuity to all water accruing to these Kern River water rights, subject primarily to place of use restrictions and monthly usage caps.

The District uses imported surface water and pumped groundwater for irrigation. The District currently provides irrigation water to about 55,000 acres during the summer months and to over 1,500 acres of spreading Basin during the winter or during wet years as shown in Attachment A (Site Location Map). During months when irrigation requirements are low, excess surface water is discharged to approximately 1,500 acres of spreading Basin, but will primarily be discharged to the 608-acre Rosedale Spreading Basin (Rosedale Basin).

Proposed Discharge

CRC is proposing to provide an average of 58 acre feet per day (ac-ft/day) or about 21,200 acre feet per year (ac-ft/yr) of produced water (Discharge 001) to the District to blend with their other water supplies (Kern River water, other surface waters, and groundwater pumped from District wells). The majority of the produced water will be blended in the Lerdo canal and used for the irrigation of crops during the summer months (Discharge 002). In the winter months or during wet years, the oil-field produced water (Discharge 001) will be delivered to up to 1,500 acres of spreading Basin, primarily the 608 acre Rosedale Basin.

The Rosedale Basin will also receive wastewater from a Grimmway Farms carrot production facility that is regulated by Waste Discharge Requirements Order R5-2015-0057. The District estimates Grimmway will discharge 158 ac-ft/yr (0.43 ac-ft/day) to the Rosedale Basin. The CRC produced water and the Grimmway wastewater are proposed to be discharged at the north end of the Rosedale Basin in Canal 9-0-18 or Canal 9-2. If there is available surface water, it will be blended, but the majority of the two waste streams will be discharged directly for groundwater recharge without blending.

The proposed project includes the construction of a 2.5 mile, 24-inch pipeline to deliver produced water to the District, the use of several existing canals for blending and delivery of the produced water for irrigation, and five spreading basins for groundwater recharge.

The quality of the CRC produced water, Discharge 001, is summarized in the following tables.

CRC Produced Water Quality

	Oil and Grease	EC	Boron	Chloride	Sodium	Arsenic	Sulfate
	<u>mg/L¹</u>	<u>umhos/cm²</u>	<u>mg/L¹</u>	<u>mg/L¹</u>	<u>mg/L¹</u>	<u>ug/L³</u>	<u>mg/L¹</u>
	21 (15 – 32)	772 (708 - 806)	1.1 (0.9 – 1.2)	85 (77 – 90)	172 (155 – 185)	76 (68 - 86)	2.7 ---
Proposed Eff. Limits	35	1,000	1.0	200	175	---	250

1. mg/L = milligram per liter.
2. umhos/cm = micromhos per centimeter.
3. ug/L = micrograms per liter.

CRC Produced Water Quality

Benzene	TPH – Crude Oil	Napthalene	Molybdenum	Radium 226	Radium 228
<u>ug/L</u>	<u>ug/L</u>	<u>mg/L</u>	<u>mg/L</u>	<u>pCi/L</u>	<u>pCi/L</u>
1.2	20,000	0.84	12	1.01	1.81

The CRC produced water is generally of good quality. Benzene is in excess of the Primary maximum contaminant level (MCLs) of 1.0 ug/L. However, with blending the produced water with Kern River and/or groundwater it is anticipated to lower the concentrations to below the effluent limits and or MCLs. The RWD included the estimated water quality of the blended waters (produced water, surface water, and groundwater) and the results are presented in the following table.

Estimated Blended Irrigation Water Quality

Constituent	Units	Flow Weighted Average¹	Annual Average²⁾
Electrical Conductivity	umhos/cm	363	364
Arsenic	ug/L	15	15
Boron	mg/L	0.30	0.3
Chloride	mg/L	32	32
Sodium	mg/L	48	49

1. Flow weighted average water quality discharged to the Lerdo Canal (RWD Table 4-9).
2. Average of 24 annual water quality values discharged to the Lerdo Canal (RWD Table 4-9)

Effluent results for the Grimmway discharge to the Rosedale Basin are presented in the following tables.

Grimmway Wastewater Results			
EC	Total Dissolved Solids	Boron	Arsenic
<u>umhos/cm</u>	<u>mg/L</u>	<u>mg/L</u>	<u>ug/L</u>
2,189	1403	Non-detect	---
(1970 – 2250)	(1170 – 1900)		---

Grimmway Wastewater Results		
Chloride	Sodium	Sulfate
<u>mg/L</u>	<u>mg/L</u>	<u>mg/L</u>
378	337	490
(330 – 420)	(293 – 388)	(370 - 800)

The Grimmway discharge to the Rosedale Spreading basin has higher concentrations of EC, chloride, sodium, and sulfate than does the CRC produced water. However, the volume of the discharge from Grimmway to the Rosedale Basin (158 ac-ft/yr or 0.43 ac-ft/day) is a very small percentage of the various water sources discharged to the Rosedale Basin. The anticipated daily average of CRC produced water will be 58 ac-ft/day during the non-irrigation season with an additional average of 16.1 ac-ft/yr of Kern River water discharged to the Rosedale Basin. Considering the volume and the quality of the other water sources, the Grimmway discharge is not anticipated to cause any exceedances of the proposed groundwater limitations for this project.

REGULATORY CONSIDERATIONS

Basin Plan, Beneficial Uses, and Regulatory Considerations

The Water Quality Control Plan for the Tulare Lake Basin, Second Edition, revised January 2004 (the “Basin Plan”) designates beneficial uses, establishes narrative and numerical water quality objectives, contains implementation plans and policies for protecting all waters of the Basin, and incorporates, by reference, plans and policies of the State of California Water Quality Control Board. The beneficial uses for the groundwater in the area of the District are municipal and domestic supply, agricultural supply, industrial process and service supply.

The beneficial uses for the surface water in the District (South Valley Floor Hydrologic Unit, North Kern Hydrologic Area) are agricultural supply, industrial process supply, industrial service supply, water contact recreation, non-contact water recreation, warm freshwater habitat, wildlife habitat, rare and endangered species habitat, and groundwater recharge.

In June 1970, the Department of Water Resources (DWR) submitted a *Report on Poso Creek Water Quality Evaluation, Kern County*. The report evaluated the effect of produced water discharges from the Mt. Poso, Poso Creek, Round Mountain, and Kern Front Oil Fields on the Poso Creek Basin. The quality of the discharges varied widely. Mt. Poso and Round Mountain generated produced water with chlorides of 500 to 1,100 mg/L. Discharges from the Poso Creek Oil Field generated produced water with chloride concentrations of 215 to 715 mg/L. Chloride concentrations in produced water from the Kern Front Oil Field ranged from 60 to 100 mg/L. In 1969, chlorides in oil field discharges (720 mg/L average) totaled 26,050 tons, corresponding roughly to 75,000 tons of salt. Measured chlorides indicated that chloride in groundwater increased from less than 20 mg/L in 1916 to over 600 mg/L in 1969. This report served as a basis for a Regional Water Board Resolution adopted on 23 November 1970. Resolution 71-122 limited the maximum EC, chloride, and boron concentration in “waste waters discharged to Poso Creek or its tributaries and to... unlined sumps...” to 1,000 umhos/cm, 200 mg/L and 1.0 mg/L, respectively. The Central Valley Water Board’s implementation of Resolution 71-122 effectively stopped uncontained discharge of produced water with unacceptable high salt concentrations in an area it called the Poso Creek Subarea.

Follow-up sampling showed the impact of the high salt discharges persisted in 1980. A 1980 map depicts groundwater chloride concentrations along Lerdo Highway exceeding 400 mg/L.

The Basin Plan notes the entire basin is essentially closed, and salts discharged within the basin accumulate. It recognizes that salt in basin groundwater will increase over time and adopts a strategy of controlled degradation (as opposed to prevention). As a measure of the acceptable rate of degradation, the Basin Plan establishes as a water quality objective a maximum annual degradation rate no greater than six (6) umhos/cm per year for the Poso Groundwater Hydrographic Unit (Hydrologic Area Nos. 558.70, 558.80, and 558.90). The existing and proposed discharge occurs in the North Kern Hydrologic area (558.80) and the Kern Uplands Hydrologic Area (558.90).

The Basin Plan also specifies salinity limits for oil field discharges of 1,000 umhos/cm for EC, 200 mg/L for chloride, and 1.0 mg/L for boron, which are generally applied as annual averages. In 1982, the Central Valley Water Board adopted Resolution No. 82-136, amending the Basin Plan to allow discharges of produced water to exceed Basin Plan effluent limits to facilitate use for irrigation and other beneficial uses where the exception would not cause an exceedance of a water quality objective. The Basin Plan, therefore, provides some flexibility to allow produced water exceeding Basin Plan salinity limits to be used for agricultural use in water short areas, provided the discharger first successfully demonstrates to the Regional Water Board that the proposed discharge will not substantially affect water quality nor cause a violation of a water quality objective.

When adopting into the Basin Plan the EC, chloride, and boron limits of 1000 umhos/cm, 200 mg/L, and 1.0 mg/L, respectively, for discharges to the Poso Groundwater Hydrographic Unit and for discharges produced water to land, the Board considered the degradation that would occur and found it to be consistent with State Water Resources Control Board Resolution 68-16, otherwise known as the State's Antidegradation Policy. The limits reflect Best Practicable Treatment or Control for these constituents.

Basin Plan water quality objectives to protect the beneficial uses of groundwater include numeric objectives and narrative objectives, including objectives for chemical constituents, toxicity of groundwater, and taste and odor. The toxicity objective requires that groundwater be maintained free of toxic substances in concentrations that produce detrimental physiological responses in humans, plants, or animals. The chemical constituent objective states groundwater shall not contain chemical constituents in concentrations that adversely affect any beneficial use or that exceed the MCLs in Title 22, California Code of Regulations. The Basin Plan requires the application of the most stringent objective necessary to ensure that groundwater does not contain chemical constituents, toxic substances, radionuclides, or taste and odor producing substances in concentrations that adversely affect domestic drinking water supply, agricultural supply, or any other beneficial use.

The Basin Plan allows blending of wastewater with surface and groundwater to promote reuse of wastewater in water short areas provided it is otherwise consistent with water quality policies.

The Basin Plan incorporates the State's Antidegradation Policy. The Antidegradation Policy requires the Regional Water Board in regulating discharges of waste to maintain high quality waters of the State until it is demonstrated that any change in quality will be consistent with maximum benefit to the people of the State, will not unreasonably affect beneficial uses, and will not result in water quality less than that described in the Regional Water Board's policies (e.g., quality that exceeds water quality objectives). Resolution 68-16 requires that the constituents contributing to degradation be regulated to meet best practicable treatment or control (BPTC) to assure that pollution or nuisance will not occur and that the highest water quality consistent with the maximum benefit to the people of the State will be maintained.

Other Requirements/Policies

On 1 June 1994, the US Environmental Protection Agency, US Bureau of Reclamation, State Water Board, Department of Water Resources, Department of Public Health, Conference of Directors of Environmental Health, and Water Reuse Association of California signed a *Statement of Support for Water Reclamation* and resolved that agencies would reduce reclamation disincentives and regulatory constraints on water reclamation. Central Valley Water Board plans and policies support the efficient use of

the State's limited water supplies provided the beneficial uses of water are maintained and water quality objectives are met.

Resolution No. R5-2009-0028 *In support of Regionalization, Reclamation, Recycling and Conservation for Wastewater Treatment Plants* was adopted by the Central Valley Water Board in April 2009 to promote wastewater reclamation projects such as the CRC District project.

The Water Conservation Act of 2009, Senate Bill (SBX7-7), requires 20 percent reduction in statewide water use by 2020 to be achieved through implementation of Best Management Practices (BMPs) and optimization of water reclamation opportunities in the urban, industrial, and agricultural sectors. The proposed project is consistent with these goals.

The California Legislature enacted Assembly Bill 3030 during the 1992 session, subsequently codified in Water Code section 10750, *et seq.* Water Code section 10750 states, in part, that:

“Any local agency, whose service area includes a groundwater basin, or a portion of a groundwater basin, that is not subject to groundwater management pursuant to other provision of law or a court order, judgment, or decree, may, by ordinance, or by resolution if the local agency is not authorized to act by ordinance, adopt and implement a Groundwater Management Plan pursuant to this part within all or a portion of its service area.”

Water Code section 60224 empowers the District to take any action needed for protection and preservation of groundwater supplies within the District including;

1. The prevention of contaminants from entering the District groundwater supplies
2. The removal of contaminants from groundwater supplies of the District;
3. The location and characterizing of contaminants which may enter the groundwater supplies of the District,
4. The identification of parties responsible for contamination of groundwater; and
5. The performance of engineering studies.

To sustain existing irrigated agriculture, the District proposes to supplement its existing surface water supplies and groundwater with the reclamation of treated produced water as described herein. Through this approach, the District proposes to manage water used within its boundaries in a manner that meets Basin Plan objectives.

Groundwater Conditions

Within the District, groundwater is recharged through percolation from the ground surface. There is a long term trend of declining groundwater levels in District. Since the commencement of the District conjunctive reuse project in the 1950s, groundwater

levels have stabilized somewhat because spreading basin recharge causes rising groundwater levels during “wet” periods and decreasing levels during “dry” periods when there is no recharge and groundwater pumping increases.

The depth to water is highly variable due to the groundwater banking and subsequent groundwater extraction activities. The depth to groundwater has been reported to range from as deep as 430 feet bgs adjacent the Rosedale Basin in 2013, and as high as 80 feet bgs within the Rosedale Basin in 2011. The discharge to the Rosedale Basin causes large fluctuations in the groundwater elevation and the measured depth to water and is likely indicative of water banking activities conducted by the District.

The direction of flow is variable, but based on groundwater elevation contours for 2009 and 2011, the groundwater flow direction in the southern half of the District, including beneath the Rosedale Basin, has generally been to the northwest, with a gradient of 12 to 15 feet per mile (ft/mi). In the northern half of the District, the groundwater flow direction has generally been to the west, with a gradient of 7 to 10 ft/mi. The groundwater flow gradient in the vicinity of the Rosedale Basin was estimated to be 17 ft/mi based on 2012 groundwater elevation measurements. The transmissivity of the aquifer is estimated to be 160,000 to 460,000 gallons per day per foot and the hydraulic conductivity is approximately 53 to 152 feet per day.

The March 2015 RWD includes Appendix C that contains groundwater results for 100 of the District wells including seven wells, set within the Rosedale Basin. The averages of the groundwater monitoring are shown below.

Rosedale Basin					
Groundwater Quality					
Well Area	EC	Boron	Chloride	Sodium	Sulfate
	<u>umhos/cm</u>	<u>mg/L</u>	<u>mg/L</u>	<u>mg/L</u>	<u>mg/L</u>
District	659 (160 – 2500)	0.11 (0.1 – 0.48)	72 (9 – 470)	80 (20 – 390)	130 (12 to 750)
RSB	429 (240 – 890)	0.13 (0.1 – 0.22)	47 (9 – 100)	74 (13 – 160)	74 (22 – 230)
Proposed GW Limits	1,000	0.75	175	115	250

The results show that water quality is of good quality both in the District and beneath the Rosedale Basin. This Order requires the Dischargers to monitor the seven extraction wells set within the Rosedale Basin, plus an additional shallow groundwater monitoring well (MW-4) also installed within the Rosedale Basin.

Surface Water Conditions

The primary source of surface water used or irrigation in the District is the Kern River. The quality of the Kern River water from February 2009 through November 2011 is summarized in the following table.

Kern River Water Quality						
	EC	Boron	Chloride	Sodium	Arsenic	Sulfate
	<u>umhos/cm</u>	<u>mg/L</u>	<u>mg/L</u>	<u>mg/L</u>	<u>ug/L</u>	<u>mg/L</u>
	170	0.2	6.4	15	nd	17
	(80 – 290)	(nd -3.1)	(nd – 10)	(nd – 30)	nd	(3.3 to 41)
Proposed Eff. Limits	1,000	1.0	200	175	10	250

The results indicate the Kern River water is of good quality, with no exceedances of the proposed effluent limits or MCLs

DISCHARGE PROHIBITIONS, EFFLUENT LIMITATIONS, DISCHARGE SPECIFICATIONS, AND PROVISIONS

The proposed Order would prohibit discharge of wastes other than the treated produced water and would prohibit the bypass or overflow of wastes to surface waters.

Discharge Prohibitions

The proposed Order includes Discharge Prohibitions A.3 through A.5 regarding the transport of produced water and the use of wells that were previously “stimulated” as follows:

3. Discharge Prohibition A.3 prohibits the discharge of water from canals used to transport industrial wastewater (Lerdo Canal).to canals used to transport municipal and domestic water sources (Friant-Kern Canal and/or others).
4. Discharge Prohibition A.4 prohibits the discharge to land of any fluids from wells that have undergone a “well stimulation treatment”, as defined by California Code of Regulations, title 14, section 1761 (including hydraulic fracturing, acid fracturing, and acid matrix stimulation) is prohibited.
5. Discharge A.5 prohibits the discharge of fluids associated with the frac-packing process (i.e., emplacement of a filter pack into the well annulus using a pressurized high-viscosity fluid that is not a drilling mud and that does not meet the standard of well stimulation) to land. The discharge of produced water from wells that have been frac-packed is prohibited, unless the Discharger meets the requirements of Provision E.13. Provision E.13 allows the Discharger to request a specific well or wells be included in the program, provided the Discharger

demonstrates that the well or wells do not contain chemicals associated with frac-packing.

Effluent Limits

Rationale for the Effluent Limitations in this Order follow:

- a. **Oil and Grease:** An effluent limit of 35 mg/L for Oil and Grease is established in 40 CFR Part 435.50, *Oil and Grease Extraction Point Source Category, Agricultural and Wildlife Water Use Subcategory*. While the discharges to land described here are not subject to federal requirements, the Basin Plan requires the Discharger to comply with, or justify a departure from, effluent limitations set forth in 40 CFR 400 et seq. if discharge is to land. The Discharger has not provided such a justification, but rather has shown that the Treatment Facility is capable of consistently meeting the oil and grease limit of 35 mg/L. Thus the limit for the discharge (Discharge 001) is applied for this permit.
- b. **Conductivity (EC):** This Order applies the Basin Plan effluent limit for produced water of 1,000 $\mu\text{mhos/cm}$ as an annual average for Discharges 001 and 002. This same limit is appropriate for Discharge 002 because, during some dry years when little or no Kern River water is available to discharge to the Rosedale Basin, the discharge consisting largely of CRC produced water will have annual average EC levels that approach this limit. During wet years, high Kern River water flows will be blended in the discharge to the spreading Basin and the flow weighted average EC will be very low.
- c. **Boron:** This Order applies the Basin Plan effluent limit of 1.0 mg/L for oilfield wastewater as an annual average for Discharges 001 and 002. The limit is applicable to Discharge 002 as discussed above.
- d. **Chloride:** This Order applies the Basin Plan effluent limit of 200 mg/L for oilfield wastewater as an annual average for Discharges 001 and 002. The limit is applicable to Discharge 002 as discussed above.
- e. **Sodium:** The CRC produced water sodium concentration averages 172 mg/l. Therefore the effluent limit at for the discharges (Discharge 001 and Discharge 002) is set at an average annual sodium concentration of 175 mg/l. Blended concentrations discharged to the Rosedale Basin during Individual low Kern River flow years will have average annual sodium concentrations as high as 165 mg/l and high Kern River flow years will have average annual sodium concentrations of 20 mg/l or less. During some dry, low flow years, the average annual sodium concentration will exceed the water quality objective of 115 mg/l. This value is supported by the antidegradation analysis (Finding 51).

- f. **Arsenic:** The Discharger completed an arsenic soil-adsorption removal evaluation based on recent laboratory and field studies done at the Cawelo Water District (CWD) which is adjacent to the District, and has the same soils and subsurface condition: similar lithology, percentage of fine-textured soils and approximately 300 feet of unsaturated sediments above groundwater. The CWD study results for arsenic adsorption capacity of local area soils and soil and subsurface conditions at the District are provided in the Report of Waste Discharge. This analysis demonstrates that the unsaturated soils underlying the Rosedale Basin and the irrigated areas have sufficient capacity to adsorb all arsenic from the proposed project discharge containing a concentration as high as 120 ug/L. Discharges from the CRC Treatment Facility will not contain arsenic concentrations approaching 120 ug/L. The results demonstrate that there will be no change in the arsenic concentration in underlying groundwater associated with project discharges. Therefore, this Order does not contain arsenic limits.

The effluent limits described above are presented below in tabular form.

Discharge 001

From CRC to the District

<u>Constituent</u>	<u>Units</u>	<u>Daily Maximum</u>	<u>Annual Average</u>
Flow	mgd	18.5	---
EC	umhos/cm	---	1,000
Boron	mg/L	---	1.0
Chloride	mg/L	---	200
Sodium	mg/L	---	175
Oil and Grease	mg/L	35	---

Discharge 002

Irrigation Season (002)

<u>Constituent</u>	<u>Units</u>	<u>Daily Maximum</u>	<u>Annual Average</u>
EC	umhos/cm	---	1,000
Boron	mg/L	---	1.0
Chloride	mg/L	---	200
Sodium	mg/L	---	175

Groundwater Limits

This Order prescribes groundwater limitations that implement water quality objectives for groundwater from the Basin Plan. The limits proscribe the discharge, in combination with other sources, from causing groundwater underlying the District to contain waste constituents in concentrations that adversely affect beneficial uses. As the District occupies a large portion of the Poso Hydrographic Unit, this Order applies the Basin Plan incremental EC limit that states in no case shall the discharge, in combination with

other sources, cause average EC in groundwater on an average basin-wide basis to increase by more than six (6) umhos/cm per year over a five year period.

This Order also proscribes the discharge from causing groundwater to contain waste constituents in concentrations greater than the following in the area affected by discharges to the Basin:

<u>Constituent</u>	<u>Units</u>	<u>Level</u>
EC	umhos/cm	1,000
Arsenic	ug/L	10
Boron	mg/L	0.75
Chloride	mg/L	175
Sodium	mg/L	115

Given the District's ability and obligation to manage the quality of groundwater within its management area, the limitations will ensure the protection of groundwater quality for the crops that can reasonably be grown within the District.

Monitoring Requirements

Water Code section 13267 authorizes the Central Valley Water Board to require monitoring and technical reports as necessary to investigate the impact of a waste discharge on waters of the State. In recent years there has been an increased emphasis on obtaining all necessary information, assuring the information is timely as well as representative and accurate, and thereby improving accountability of any discharger for meeting the conditions of discharge. Water Code section 13268 authorizes assessment of civil administrative liability where appropriate.

The proposed Order includes effluent and groundwater monitoring. The monitoring requires the District to report on the overall quality of groundwater managed by the District. It also requires the District to monitor specific wells near the Rosedale Basin to validate the District's modeling effort and to ensure the protection of groundwater being recharged by the Rosedale Basin.

Provisions

Provision E. 12 requires the submittal of a technical report determining the intrawell groundwater quality goals to quantify degradation caused by discharges of oilfield produced water to the Rosedale Basin. The proposed methodology is subject to the approval of the Executive Officer.

Provision E.13 allows the Discharger to request a specific well or wells be included in the program, provided the Discharger demonstrates that the well or wells do not contain chemicals associated with well stimulation and/or frac-packing.

Reopener

The conditions of discharge in the proposed Order were developed based on currently available technical information and applicable water quality laws, regulations, policies, and plans, and are intended to assure conformance with them. The proposed Order would set limitations based on the information provided thus far. If applicable laws and regulations change, or once new information is obtained that will change the overall discharge and its potential to impact groundwater, it may be appropriate to reopen the Order.

ANTIDEGRADATION

District Considerations

The antidegradation analysis approach used for this project consists of a comparison of water quality of the proposed project discharge to the Rosedale Basin with background groundwater quality represented in two ways: a) the 2013-2014 average groundwater quality for 7 wells completed beneath the Rosedale Basin, and c) the background groundwater quality values for the CWD service area (R5-2012-0058) which is directly upgradient of the District. The water quality constituents evaluated are arsenic, boron, chloride, sodium, sulfate, and EC. With the exception of sulfate, these constituents are known to be present in produced water at levels that should be evaluated. Sulfate was added to the analysis because the Grimmway process wastewater is high in sulfate.

The following table compares discharge constituent levels with measured groundwater quality, background groundwater quality from an adjacent water district, and Water Quality Objectives. The discharge water quality is based on the flow weighted average of 24 years of actual surface water deliveries that incorporate the variations in annual precipitation and variations in annual Kern River water supply.

	Electrical Conductivity <u>umhos/c</u> <u>m</u>	Arsenic, <u>ug/</u> <u>L</u>	Boron, <u>mg/</u> <u>L</u>	Chloride, <u>mg/</u> <u>L</u>	Sodium, <u>mg/</u> <u>L</u>	Sulfate, <u>mg/</u> <u>L</u>
Blended Groundwater for Recharge Groundwater for Beneath RSB CWD	213	9.1	0.23	13	25	20
Background Groundwater for Quality Water Quality Objectives	429	2.4	0.13	47	74	74
	618	3.4	0.14	88	56	-
	900	10	0.75	175	115	250

The Rosedale Basin discharge has lower flow weighted levels of EC, chloride, sodium, and sulfate than the average of the seven wells in the Rosedale Basin. The constituents at concentrations greater than underlying groundwater are arsenic and

boron. Based on soil and subsurface conditions at the Rosedale Basin, soil adsorption of arsenic should result in no impact to groundwater. The boron in flows discharged to the Rosedale Basin, 0.23 mg/l, exceeds that of underlying groundwater but is much lower than the WQO of 0.75 mg/l. The blended discharge water quality was also better than that of the CWD background groundwater quality.

The antidegradation analysis above was also supported by additional calculations of a five year drought condition that occurred between 2001 and 2005. Groundwater and vadose zone mixing calculations were used to demonstrate that, during this period when three of five years did not have surface water discharge to the Rosedale Basin, the spreading basin discharge flows did not result in underlying groundwater concentrations higher than the WQOs.

Title 27

Title 27 of the California Code of Regulations, section 20005 et seq (Title 27) contains regulations to address certain discharges to land. Title 27 establishes a waste classification system, specifies siting and construction standards for full containment of classified waste, requires extensive monitoring of groundwater and the unsaturated zone for any indication of failure of containment, and specifies closure and post-closure maintenance requirements. Generally, no degradation of groundwater quality by any waste constituent in a classified waste is acceptable under Title 27 regulations.

Unless exempt, release of designated waste is subject to full containment pursuant to Title 27 requirements. Title 27 Section 20090(b) exempts discharges of designated waste to land from Title 27 containment standards and other Title 27 requirements provided the following conditions are met:

- a. The applicable regional water board has issued waste discharge requirements, or waived such issuance;
- b. The discharge is in compliance with the applicable basin plan; and
- c. The waste is not hazardous waste and need not be managed according to Title 22, CCR, Division 4.5, Chapter 11, as a hazardous waste.

The discharge of produced water from CRC's Section 23 treatment facility meets the above requirements and is, therefore, exempt from Title 27.

CEQA

In accordance with the California Environmental Quality Act (CEQA) (Public Resources Code section 21000, et seq.), the District prepared and circulated an Environmental Review and Mitigated Negative Declaration for the project in March 2015. The District issued a Notice of Determination adopting the Mitigated Negative Declaration for the project on 30 April 2015.