



entire area of the pond is not used in the process. The pond was sloped to the north to allow wastewater to collect in a steel lined sump constructed at the northern end of the pond, and a berm was constructed to contain the wastewater within the sump area.

Proposed loading rates from the 1995 RWD were based on having 217 acres for disposal of the wastewater, and the results are shown below.

- Nitrogen – 175 lbs/ac/yr
- Potassium – 433 lbs/ac/yr
- BOD – 55 lbs/ac/day

In 1998 Erwin submitted another RWD requesting an increase in the daily average flow to 1.31 mgd, and an increase in the seasonal or annual discharge to 32.75 million gallons a year to the 217 acre land application area. Erwin included updated loading estimates:

- Nitrogen – 158 lbs/ac/yr
- Potassium – 607 lbs/ac/yr
- BOD – 93 lbs/ac/day

Around 2000 the Discharger, without notifying the Board, installed about 45 acres of unlined checks that are subdivided into around 21 smaller checks that are each about 2 acres in size. Wastewater is discharged to the sump in the retention pond, and then to the checks. There are 10 checks on the eastern side and 11 on the west side of the area. From the checks, wastewater is supposed to be discharged to the land application areas via a drip system, or “when the solids get too high,” flood irrigation. During an inspection of the Facility in April 2014, a considerable amount of pistachio processing solids were observed in the eastern portion of the checks where the wastewater first enters. The amount of pistachio solids decreased in the checks as one moved to the west. The discharge is not spread over the entire acreage available for the recycling of wastewater, as described in the RWD. Rather, it is discharged to the 45 acres of checks and allowed to percolate into the vadose zone.

Central Valley Water Board staff calculated loading rates using the 2011 through 2013 self-monitoring data for the discharge of wastewater to 45 acres and the results are included in the following table:

<u>Year</u>	<u>Total Nitrogen (lbs/ac/yr)</u>	<u>Potassium (lbs/ac/yr)</u>	<u>TDS (lbs/ac/yr)</u>	<u>BOD (lbs/ac/day)</u>
2011	625	3,185	6,870	327
2012	877	4,828	11,542	337
2013	1,726	7,592	22,766	848

The loading rates indicate that the discharge of pistachio processing wastewater to the 45 acres of checks threatens to pollute the underlying groundwater with nitrate as nitrogen and TDS.

### Existing Facility and Discharge

The 1998 RWD proposed reusing an average of 1.31 mgd to 217 acres of land application areas. MRP Order 93-049 requires BOD, EC, TDS, total Kjeldahl nitrogen (TKN), nitrate as nitrogen, and total nitrogen monitoring. Analytical results since 2011 are presented below:

#### Effluent Results

Date	Potassium	pH	BOD	EC	TDS	TKN	Nitrate as nitrogen
		<u>s.u.</u>	<u>mg/L</u>	<u>umhos/cm<sup>1</sup></u>	<u>mg/L</u>	<u>mg/L</u>	<u>mg/L</u>
9/23/11	230	6.9	73	460	294	29	13.0
9/29/11	540	5.5	2100	1920	1229	109	4.2
10/14/11	570	5.1	2500	1870	1197	79	6.7
10/18/11	310	5.2	1600	1320	845	79	2.4
9/14/12	109	5.7	400	840	538	43	12.0
9/21/12	250	5.3	1100	1190	762	87	1.1
9/26/12	1210	5.3	3200	3740	2394	188	8.7
10/4/12	920	5.0	2600	3520	2253	108	3.1
9/5/13	291	5.2	1200	1630	1043	51	1.0
9/13/13	310	5.5	1300	1650	1056	115	3.7
9/19/13	1248	5.3	5900	5300	3392	195	5.2
9/26/13	880	4.7	4400	4200	2688	238	11.0
<u>Averages</u>	572	5.4	2198	2303	1474	110	6.0

<sup>1</sup>. umhos/cm = micromhos per centimeter.

The data indicates considerable variability in the results within each processing season and that the effluent EC, TDS, BOD, and potassium results are high. The results also show that the effluent results increased in 2013 when compared to the results of 2011 and 2012.

### Proposed Discharge

The Discharger submitted a July 2014 RWD requesting an increase in the average daily flow limit to 2.0 mgd, with a daily maximum of 2.6 mgd to a land application area comprised of 400 acres of farmland planted with pistachio trees. The seasonal discharge is estimated to be 80 million gallons and the Discharger is proposing to reuse wastewater on 400 acres of land owned by Keenan and currently cropped with pistachios. Using the proposed volumes discharged to 400 acres and the average 2011 through 2013 analytical results indicates the following loadings for the 2011 through 2013 processing seasons.

Year	Total Nitrogen ( <u>lbs/ac/yr</u> )	Potassium ( <u>lbs/ac/yr</u> )	TDS ( <u>lbs/ac/yr</u> )	BOD ( <u>lbs/ac/day</u> )
2011	70	358	773	37
2012	99	543	1,298	38
2013	194	854	2,561	95

The loading estimates are considerably lower than those presented for the discharge to 45 acres. Considering the depth to groundwater of about 350 feet bgs, and the variable lithology of the underlying deposits, the discharge would be unlikely to reach and then degrade the underlying

groundwater if applied evenly over the 400 acres. Nitrogen loading at 194 lbs per acre is only slightly higher than the 188 lbs/ac/yr that the orchards can remove, but the depth to groundwater minimizes the potential for nitrogen to degrade the underlying groundwater. BOD loading at less than 100 lbs/ac/day should not cause degradation of the underlying groundwater. Potassium loading will exceed the ability of the pistachio trees to remove potassium from the soils and potassium may accumulate in the vadose zone. However, potassium readily binds to soil, and crops can and will take up more potassium than required, if available, with no reduction in yield. There are no specific water quality objectives set for potassium other than the overall objectives set for EC. Considering the depth to water of about 350 feet bgs, the presence of interbedded clays in the underlying lithology, the short duration of the discharge, and the discharge of wastewater spread evenly over 400 acres of land, the proposed discharge will minimize the likelihood that potassium will cause significant degradation of groundwater. FDS or salt loading at about 900 lbs/ac/yr is not expected to be a problem.

### **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 Keenan facility is in the Westside Basin hydrologic unit and the beneficial uses for the groundwater are municipal and domestic supply, agricultural supply, and industrial service supply. The beneficial uses for the surface water in the area of the Keenan facility (Valley Floor Waters) are agricultural supply, industrial process and service supply, water contact recreation, non-contact water recreation, warm freshwater habitat, wildlife habitat, rare and endangered species habitat, and groundwater recharge.

The Tulare Lake Basin Plan contains effluent limits for EC that recognize that the incremental increase in salt from use and treatment must be controlled to the extent possible. The maximum EC of the effluent discharged to land shall not exceed the EC of the source water plus 500 umhos/cm. Discharges to areas that may recharge good quality groundwater shall not exceed an EC of 1,000 umhos/cm, a chloride content of 175 mg/L, or boron content of 1.0 mg/L. The Tulare Lake Basin Plan does allow for exceptions to the EC limit for industrial wastewater such as food processing wastewater that shows a "disproportionate increase in the EC of the discharge over the EC of the source water due to unavoidable concentrations of organic dissolved solids." Keenan does not monitor its discharge for fixed dissolved solids, but a wastewater sample was collected in 2014 by Central Valley Water Board staff and analyzed for TDS and FDS along with other constituents. The sample had a TDS result of 5,400 mg/L, a FDS result of 1,700 mg/L, and an EC result of 2,400 umhos/cm, indicating the discharge is high in organic dissolved solids and that Keenan's discharge qualifies for the exception.

### **Source Water**

Supply water is provided to the Keenan facility by two sources: surface water is provided by the Westlands Water District, and groundwater is supplied by an onsite supply well. The Westlands Water District water is the primary water source and is used for domestic and production

purposes. The onsite supply well (Well 304) is used for production and irrigation purposes. Well 304 is 970 feet deep and is screened from 450 feet bgs to the base of the well at 970 feet bgs. A sample was collected from the Well 304 in February 2014. Results from 2014 for both sources of supply water are shown in the following table. Results shown in bold exceed the MCL.

<b>Supply Water Results</b>						
<u>Source</u>	<u>EC</u> <u>umhos/cm</u>	<u>TDS</u> <u>mg/L</u>	<u>Chloride</u> <u>mg/L</u>	<u>Sulfate</u> <u>mg/L</u>	<u>Nitrate as N</u> <u>mg/L</u>	<u>Potassium</u> <u>mg/L</u>
Westlands	710	410	130	71	<0.1	3.9
Well 304	<b>1,300</b>	<b>920</b>	63	<b>490</b>	2.5	2.1
MCL	900/1600	500/100	250/500	250/500	45	na

### **Groundwater Conditions**

The receiving water is groundwater and the depth to water and the direction of groundwater flow data for the area is limited. The depth to water in an onsite supply well (Well 304) was 351 feet bgs on 13 February 2014, but this well is not set in first encountered groundwater. It is set both above and below the Corcoran Clay confining layer. The depth to the top of the Corcoran Clay in this area is about 700 feet bgs. The upper unconfined aquifer is comprised of interbedded sands, silts, clays, and gravels. The finer-grained units act as aquitards or semi-confining layers that restrict the vertical flow of groundwater to the lower portions of the unconfined aquifer.

Groundwater quality beneath the facility is of generally poor quality for EC, chloride, and sulfate as illustrated by the results of samples collected from Keenan's former onsite well (Olive Well) as summarized below. The results shown in bold exceed the MCLs for EC, nitrate as nitrogen, chloride, and sulfate. The depth of the Olive Well was 1,050 feet bgs with a 600 foot well screen from 450 feet bgs to 1,050 feet bgs. It was screened both above and below the Corcoran Clay and drew water from both aquifers. It was destroyed in 2008.

### **Former Onsite Well (Olive Well) Results**

<u>Date</u>	<u>EC</u> <u>umhos/cm</u>	<u>Sodium</u> <u>mg/L</u>	<u>Nitrate as N</u> <u>mg/L</u>	<u>Chloride</u> <u>mg/L</u>	<u>Sulfate</u> <u>mg/L</u>	<u>Boron</u> <u>ug/L</u>
August 1989	<b>2060</b>	10.4	<b>19</b>	4.8	na	600
July 2008	<b>2600</b>	260	<b>14</b>	<b>280</b>	<b>930</b>	700

Regional groundwater data on the United States Geological Survey (USGS) Water Quality Portal web site was available for 27 USGS wells and three "drains" within a five mile radius of the Keenan facility. Depth to water information was not available, but the well depths were listed as ranging from 300 feet to 2,444 feet bgs. Only two of the 27 USGS wells appear to have been installed above the Corcoran Clay. Well 360305200004101 is/was about 1.5 miles south of the facility and well 360536119575901 is/was about 1.75 miles east of the facility. Analytical results for samples collected from each well in 1951 and 1968 are summarized in the following table. The results in bold exceed the MCLs for the respective constituents.

**USGS Historical Groundwater Data - Wells completed above the Corcoran Clay**

<u>Well Number</u>	<u>Depth</u> <u>feet bgs</u>	<u>Date</u> <u>Sampled</u>	<u>EC</u> <u>umhos/cm</u>	<u>TDS</u> <u>mg/L</u>	Nitrate as				
					<u>N</u> <u>mg/L</u>	<u>Sodium</u> <u>mg/L</u>	<u>Sulfate</u> <u>mg/L</u>	<u>Chloride</u> <u>mg/L</u>	<u>Boron</u> <u>ug/L</u>
360305200004101	350	8/13/51	<b>1,270</b>	<b>830</b>	na	200	<b>440</b>	76	440
" "		7/15/68	<b>1,310</b>	<b>836</b>	2.48	200	<b>570</b>	170	800

  

<u>Well Number</u>	<u>Depth</u> <u>feet bgs</u>	<u>Date</u> <u>Sampled</u>	<u>EC</u> <u>umhos/cm</u>	<u>TDS</u> <u>mg/L</u>	Nitrate as				
					<u>N</u> <u>mg/L</u>	<u>Sodium</u> <u>mg/L</u>	<u>Sulfate</u> <u>mg/L</u>	<u>Chloride</u> <u>mg/L</u>	<u>Boron</u> <u>ug/L</u>
360536119575901	300	8/14/51	<b>913</b>	<b>618</b>	na	190	<b>300</b>	32	150
" "		7/15/68	891	<b>585</b>	0.271	160	<b>290</b>	13	640

Eight additional wells are or were within two miles of the Keenan facility. The data is primarily from one or two sampling events conducted in August 1951 and July 1968 and the results provide a good look at the historical groundwater quality of the area. The USGS data indicates these wells extend below the Corcoran Clay, but are actually screened both above and below the Corcoran Clay.

**USGS Historical Groundwater Data - Wells completed below and above the Corcoran Clay**

<u>Well Number</u>	<u>Depth</u> <u>feet bgs</u>	<u>Date</u> <u>Sampled</u>	<u>EC</u> <u>umhos/cm</u>	<u>TDS</u> <u>mg/L</u>	Nitrate as				
					<u>N</u> <u>mg/L</u>	<u>Sodium</u> <u>mg/L</u>	<u>Sulfate</u> <u>mg/L</u>	<u>Chloride</u> <u>mg/L</u>	<u>Boron</u> <u>ug/L</u>
360359120031701	900	1968	<b>955</b>	<b>635</b>	na	150	<b>320</b>	51	370
360409120025201	1,937	1968	874	<b>597</b>	0.361	150	<b>300</b>	27	470
360355120023601	875	1968	<b>986</b>	<b>662</b>	0.045	160	<b>310</b>	55	430
360305120004701	1,400	1951	<b>1,270</b>	<b>830</b>	na	170	<b>350</b>	49	200
360631120021401	1,165	1951	<b>1,250</b>	<b>809</b>	na	140	<b>450</b>	32	800
360609120011301	1,306	1951	<b>1,000</b>	<b>658</b>	na	150	<b>350</b>	36	100
360357120004101	1,196	1951	<b>1,230</b>	<b>822</b>	na	170	<b>470</b>	51	400
360403120004201	825	1968	<b>1,330</b>	<b>867</b>	5.65	180	<b>430</b>	82	290

The results are similar to those of the two wells installed above the Corcoran Clay with EC, TDS, and sulfate all typically in excess of their respective MCLs. Boron results are high, with one being in excess of the Agricultural Water Quality goal of 700 ug/L.

Shallow groundwater with high EC levels is present to the northeast of the Keenan facility. According to the DWR maps, *Lemoore/Corcoran 2000, Areas of Shallow Groundwater* and *Lemoore/Corcoran 2001, Electrical Conductivity in Shallow Groundwater*, shallow groundwater with EC results as high as 4,000 umhos/cm are present approximately two miles to the northeast of the facility.

**Compliance History**

The current discharge exceeds the flow limit of 0.258 mgd in Order 93-049, but has generally been within the ranges requested in the RWDs. The flows in 2013 averaged 1.43 mgd, which exceeds the requested flow of 1.31 mgd from the 1998 RWD. As discussed previously, the discharge has been to about 45-acres of checks, not the 136 or 217 acres reported in the annual reports or RWD. The MRP requires the analyses of the effluent samples for total

inorganic dissolved solids in addition to testing for TDS. Analytical results for total inorganic dissolved solids have not been provided, but the discharge was monitored for volatile dissolved solids (VDS) from 1996 through 2003. VDS analyses were discontinued in 2004 and have not been included since. The Discharger submits one SMR annually for each processing season in accordance with the MRP.

### **Antidegradation**

State Water Resources Control Board Resolution 68-16 ("Policy with Respect to Maintaining High Quality Waters of the State") (hereafter Resolution 68-16) prohibits degradation of groundwater unless it has been shown that:

- a. The degradation will not unreasonably affect present and anticipated future beneficial uses.
- b. The degradation does not result in water quality less than that prescribed in State and regional policies, including violation of one or more water quality objectives, and
- c. The discharger employs best practicable treatment or control (BPTC) to minimize degradation.
- d. The degradation is consistent with the maximum benefit to the people of the State.

As stated previously, groundwater quality in the region is generally poor for EC, chloride, and sulfate. Keenan proposes to discharge its wastewater to 400 acres of orchards that will be used as land application areas. However, Keenan also proposes to continue discharges to the unlined checks. This Order requires Keenan to modify its system (e.g., line the retention pond and checks to Title 27 standards), or implement other measures to keep wastewater in the unlined checks from percolating to groundwater.

For salinity, the Basin Plan contains an EC limit exception for food processors that exhibit a disproportionate increase in the EC of the discharge over the EC of the source water due to unavoidable concentrations of organic dissolved solids. Chloride concentrations in the wastewater vary considerably with a range from 30 to 355 mg/L and have averaged about 185 mg/L since 2012. This Order requires Keenan to submit a Salinity Management Plan and evaluate potential methods to reduce the salt load in its discharge. Boron is part of the current effluent analytical suite, and has averaged about 0.55 mg/L since 2012.

Nitrogen loading is anticipated to be less than 200 lbs/ac/yr (194 lbs per acre using 2013 results and 400 acres for reuse) and is only slightly higher than the 188 lbs/ac/yr that the orchards can remove. However, when one considers the depth to groundwater being on the order of 350 feet bgs and the presence of interbedded silts and clays in the underlying lithology, the potential for nitrogen to degrade the underlying groundwater is low. Organic BOD loading at less than 100 lbs/ac/day should not cause degradation of the underlying groundwater. Potassium loading will again greatly exceed the ability of the pistachio trees to remove potassium from the soils, but as discussed above, with the depth to water being about 350 feet bgs, the presence of interbedded clays in the underlying lithology, the short duration of the discharge, and the discharge of wastewater spread evenly over 400 acres of land, will minimize the likelihood that potassium

will cause significant degradation of groundwater. FDS or salt loading at about 900 lbs/ac/yr is not expected to be a problem.

The Order establishes effluent limits and groundwater limits for the Keenan pistachio facility compliance with which will prevent any unreasonable threat to present or anticipated beneficial uses or groundwater quality that exceeds water quality objectives set forth in the Basin Plan.

Degradation of groundwater by some of the typical waste constituents released with discharge from a municipal wastewater utility after effective source control, treatment, and control is consistent with maximum benefit to the people of the State. The technology, energy, and waste management advantages of municipal utility service far exceed any benefits derived from a community otherwise reliant on numerous concentrated individual wastewater systems, and the impacts on water quality will be substantially less. Economic prosperity of valley communities and associated industry is of maximum benefit to the people of the State, and therefore sufficient reason to accommodate growth and groundwater degradation provided terms of the Basin Plan are met.

For the foregoing reasons, this Order satisfies all four elements of Resolution 68-16.

### **Title 27**

Title 27 of the California Code of Regulations, section 20005 et seq (Title 27) contains regulations to address certain discharges to land.

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.

Because of the threat to underlying groundwater from the discharge of pistachio processing wastewater to the 45 acres of unlined checks for the settling of solids, the unlined checks are not exempt from Title 27 requirements. This Order requires Keenan to implement measures to obtain an exemption in accordance with Title 27 section 20090 (b), or line the checks to Title 27 containment standards.

### **Proposed Order Terms and Conditions**

### **Discharge Prohibitions, Effluent Limitations, Discharge Specifications, and Provisions**

The proposed Order would prohibit discharge to surface waters and water drainage courses.

The proposed Order would prescribe discharge specifications that limit the BOD loading to 150 lbs/ac/day.

The proposed Order requires monitoring of the discharge for pH, BOD, EC, TDS, FDS, TKN, nitrite as nitrogen, nitrate as nitrogen, ammonia, total nitrogen, and general minerals. The Order also requires daily inspections of the land application areas.

The proposed Order would require the Discharger to submit and implement Salinity and Nutrient Management Plans.

The proposed Order would prescribe groundwater limitations that implement water quality objectives for groundwater from the Basin Plan. The limitations require that the discharge not cause or contribute to exceedance of these objectives or natural background water quality, whichever is greatest.

The proposed Order requires Keenan to implement measures to obtain exemption in accordance with Title 27 section 20090 (b), or line the sump and/or checks to Title 27 containment standards to ensure that the discharge is not degrading the underlying groundwater.

### **Monitoring Requirements**

Section 13267 of the CWC 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. Water Code Section 13268 authorizes assessment of civil administrative liability where appropriate.

The proposed Order includes effluent, source water, land application area monitoring, and possibly groundwater monitoring. The monitoring is necessary to evaluate the extent of the potential degradation from the discharge.

### **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.