

**Regional Water Quality Control Board
Central Valley Region
Board Meeting – 7/8 December 2006**

**Response to Written Comments for Valley Waste Disposal Company
and Cawelo Water District, Kern Front No. 2 Treatment Plant – Cawelo Reservoir B
Tentative Waste Discharge Requirements**

At a public hearing scheduled for 7/8 December 2006, the Regional Water Quality Control Board, Central Valley Region (Regional Water Board) will consider adoption of Waste Discharge Requirements (NPDES No. CA0081311) (hereafter Permit) for Valley Waste Disposal Company (VWDC) and Cawelo Water District (CWD), Kern Front No. 2 Treatment Plant (Facility) in the Kern Front Oil Field, which was circulated as tentative on 20 October 2006. This document contains responses to written comments received from interested parties regarding the tentative Permit. Written comments from interested parties were required to be received by the Regional Water Board by 20 November 2006 in order to receive full consideration. Comments were received by the deadline from:

1. Valley Waste Disposal Company (VWDC)
2. Vintage Production California LLC (also known as Oxy USA, Inc.)
3. Cawelo Water District (CWD)

Written comments from the above interested parties are summarized by staff below, followed by the staff response.

VALLEY WASTE DISPOSAL COMPANY COMMENTS

Regional Water Board staff responded to comments from VWDC in a letter dated 30 November 2006 that is attached.

OXY USA, INC., COMMENTS

Regional Water Board staff responded to comments from Oxy in a letter dated 30 November 2006 that is attached.

CAWELO WATER DISTRICT (CWD) COMMENTS

CWD – COMMENT #1: Regarding Finding 12, CWD states that surface water blended in Reservoir B consists of water other than just Kern River water. CWD states that water discharged to Poso Creek is blended water rather than reclaimed water. Further CWD states that Poso Creek is non-jurisdictional and on this basis requests that Poso Creek not be referred to as a water of the United States.

RESPONSE: Finding 12 has been changed to reflect that surface water blended with oilfield production water in Reservoir B consists of water other than just Kern River water. Finding 12 has also been changed to state that water discharged to Poso Creek is this blended water rather than just reclaimed oilfield production wastewater. However, Poso Creek is still properly referenced as a water of the United States. CWD provided

documentation from the U.S. Army Corps of Engineers stating a determination that Poso Creek is not a jurisdictional waterway pursuant to Section 404 of the Federal Clean Water Act. The Corps has no jurisdiction over matters pertaining to Section 402 of the Federal Clean Water Act and its determination is not germane to decisions affecting issuance of NPDES permits. USEPA, which has jurisdiction in this area, has not issued a determination that Poso Creek is not a jurisdictional water pursuant to Section 402 of the Federal Clean Water Act. Therefore, Poso Creek must continue to be regarded as a water of the United States.

CWD – COMMENT #2: CWD requests changes to Finding 15 to more accurately reflect the agreement between CWD and other downstream water districts.

RESPONSE: The requested changes have been made.

CWD – COMMENT #3: CWD disagrees with Regional Board staff's position that the 1994 and 2003 Studies do not quantify the annual average increase in EC of groundwater underlying the CWD.

RESPONSE: The 2003 Study reports the total amount of salt per acre imported at the time from sources into the CWD for irrigation activities. The 2003 Study evaluates the increased salt load associated with VWDC's request for increases in effluent EC. It does not evaluate the increased salt load associated with VWDC's requested increase in flow from 4.3 to 7.4 mgd. It also does not evaluate the increased salt load associated with Chevron's requested increase in flow from a currently permitted annual average flow of 18 mgd to approximately 50 mgd. The 2003 Study does not describe the annual average increase in groundwater EC that would be result from the salt load it evaluates. The 2003 study does not calculate the salt loads from the increases under consideration. Therefore it cannot show compliance with the Basin Plan.

CWD – COMMENT #4: Concerns a spelling error in Finding 47 that has been corrected.

CWD – COMMENT #5: Regarding Finding 35, CWD disagrees that CWD's groundwater monitoring practices make it difficult to determine what effect irrigation is having on the quality of underlying groundwater. The CWD comments that 58 wells appropriately spaced to cover the entire district area have been monitored for water quality during 10 years of annual monitoring depending on operational status.

RESPONSE: CWD's *Produced Water Reclamation Project, Kern County, Monitoring and Reporting Program* report dated January 2005 (2005 Report) indicates that 17 wells of the 43 wells included in the initial (1995) monitoring network were not sampled during 2004 and that 11 replacement wells have been added since 1998. Five replacement wells were not sampled during 2004, when a total of 32 wells were sampled. As a significant portion of the monitoring network has not been continuously sampled since 1995, EC, chloride, and boron concentration trends cannot be determined at some locations and EC concentrations

used for each Section have been interpolated from different data points during different portions of the monitoring history.

Maps included in the 2005 Report indicate that groundwater depth data are collected from a monitoring network covering the entire District. Groundwater depth was measured in 90 wells during 1995 and in 84 wells during 2004. A reduced number of wells are analyzed for water quality and these select wells are concentrated along the eastern and western District boundaries. Approximately 15 square miles in the center of District north and south of Poso Creek are not monitored for water quality. In fact, the groundwater quality monitoring network does not cover a representative portion of the entire District area and the data upon which the conclusions of the Report are based are interpolated data not real well data.

Based on data included in the 2005 Report, the average depth to groundwater in the CWD since 1980 has been approximately 400 feet bgs. This relatively thick vadose zone makes it more difficult to model percolation rates and chemical reactions in vadose water moving through zones of varying permeability and chemical reactivity, and to predict when the effect will be seen in groundwater. Migration time to the water table under efficient irrigation will be very long, and thus the impact from the last ten years of increased use of irrigation water within the CWD is unlikely to be seen even with representative monitoring wells. Increases in groundwater salinity from use of poorer quality produced water might not be detected for some time. Even if past irrigation practices have improved groundwater quality, it is plausible that the salt loads associated with the flow and concentration increases requested by VWDC, the salt loads associated the flow increase requested by Chevron U.S.A., Inc.; and the displacement of surface water imports by increased oilfield production water will reverse this trend.

CWD – COMMENT #6: CWD suggests a change in the language at the beginning of the Receiving Water Limitations

RESPONSE: The suggested change has not been made. The language in the Order is appropriate as written.

CWD – COMMENT #7: CWD suggests a change in Receiving Water Limitation D.18 so that the limitations apply only when discharge is occurring to Poso Creek.

RESPONSE: The suggested change has not been made. The cumulative effect from all sources cannot be allowed to result in exceedances of water quality objectives. Thus, discharge in combination with other sources shall not cause exceedances of Receiving Water Limitation D.18

CWD – COMMENT #8: CWD requested clarification of Provision F.7 stating that installation of continuous EC meters applies only to Discharge 001 and this has been clarified.

CWD – COMMENT #9: CWD believes that the Study submitted in July 2003 provides a sufficient evaluation and quantification of the impact of irrigation activities on groundwater quality and compliance with the Basin Plan. CWD further states that it may update and modify the 2003 Study to show that current requests by VWDC and Chevron will comply with the Basin Plan and CEQA.

RESPONSE: The Basin Plan establishes effluent limits of 1,000 $\mu\text{mhos/cm}$, 200 mg/L, and 1.0 mg/L for EC, chlorides, and boron, respectively, for discharges of oil field wastewater. The Basin Plan also establishes an incremental water quality objective that limits annual increases of groundwater salinity to no more than 6 $\mu\text{mhos/cm}$ in the Poso Groundwater Hydrographic Unit. The CWD lies within the Poso Groundwater Hydrographic Unit. The Basin Plan allows discharges of oil field waste that exceed the maximum salinity concentrations listed above provided the Discharger demonstrates to the Regional Water Board's satisfaction that the proposed discharge will not substantially affect groundwater quality nor cause a violation of water quality objectives. VWDC has requested daily maximum EC, chloride, and boron effluent limits of 1,300 $\mu\text{mhos/cm}$, 125 mg/L, and 1.6 mg/L, respectively. As the requested effluent limits for EC and boron exceed effluent limits allowed by the Basin Plan, VWDC and CWD have the burden of demonstrating an exception would not violate the Basin Plan.

The 2003 Study evaluates salt loading and calculates the salt loading throughout the CWD in terms of lbs/acre/year but does not indicate what effects this salt loading will have on the quality of underlying groundwater. Further the 2003 Study does not incorporate the effects that proposed flow rate increases by both VWDC and Chevron will have on salt loading and the quality of groundwater underlying the CWD. Consequently, the 2003 Study does not demonstrate that a Basin Plan exception for the requested changes, in combination with irrigation and other oil field waste discharges throughout the CWD, will not substantially affect groundwater quality or cause a violation of water quality objectives. As the demonstration of consistency with the Basin Plan has not been made, the salinity limits requested by VWDC cannot be authorized. The 2003 Study will require substantial modification to adequately demonstrate Basin Plan consistency and compliance with CEQA.

CWD – COMMENT #10: CWD states that Provision 9.e does not read well and should be revised.

RESPONSE: The requested change has been made.

CWD – COMMENT #11: CWD requests clarification of the second paragraph on page 4 of the Information Sheet to reflect that surface water blended in Reservoir B consists of water other than just Kern River water.

RESPONSE: The requested change has been made.

CWD – COMMENT #12: CWD noted that the last sentence in the fourth paragraph on page 4 of the Information Sheet was incorrect and the sentence has been removed.

CWD – COMMENT #13: CWD disagrees with statements in the Information Sheet that currently permitted discharges have the potential to increase the EC of groundwater underlying the CWD by up to 16 $\mu\text{mhos/cm}$ per year and that discharges proposed by VWDC and Chevron have the potential to increase the EC of groundwater underlying the CWD by up to 18 $\mu\text{mhos/cm}$ per year. CWD asserts that these statements are provided without statistical or computational support.

RESPONSE: Potential impacts of salt loading from irrigation and reclamation activities on groundwater were calculated in the Information Sheet using the same method that was used by CWD in the 1994 Study. This involves dividing an annual salt mass-loading rate by the estimated volume size of the underlying aquifer. Differences between Regional Water Board Staff calculations and the results of the 1994 Study stem mostly from differences in the way the salt mass-loading rates are calculated. As stated in the response to Comment #3, the 1994 Study only calculates an incremental groundwater salinity increase above previously existing salt load conditions. The calculations in the Information sheet consider a total net annual salt loading throughout the CWD (considering salt input from all sources rather than just salt input from new sources), which is what consistency with the Basin Plan requires. Salt loading calculations in the Information Sheet are based on current and proposed maximum permit limitations, not actual data from past performance, as is required to project the maximum impact that might result from authorizing a particular exception and statistical support is neither possible nor appropriate.

Several assumptions were used when calculating the potential impacts of salt loading throughout the CWD on underlying groundwater. These same assumptions are used by CWD in the 1994 Study and are as follows:

1. All salts discharged throughout the CWD during the course of irrigation and reclamation activities reach the underlying aquifer.
2. All salts in the groundwater aquifer are completely mixed and evenly distributed throughout the aquifer.
3. The size of the underlying groundwater aquifer is 3,274,617 acft.
4. Total annual irrigation need in the CWD is 107,769 acft.
5. The total fresh water available from the Beardsley Canal is 62,500 acft.
6. As importation of produced water increases, the pumping of groundwater decreases at a 1:1 ratio.
7. When the volume of imported produced water is sufficient to make pumping groundwater unnecessary, the CWD will then reduce the importation of surface water from the Beardsley canal so that total irrigation deliveries remain at 107,769 acft.

The next step is to calculate the rate of salt mass loading from all sources throughout the CWD. This is done for three separate scenarios that correspond to current and proposed effluent and flow limitations. The calculations for each scenario are performed in the same manner. Scenario 1 corresponds to currently permitted flow rates and effluent limitations. The calculations for Scenario 1 are shown below. Calculations for Scenarios 2 and 3 are performed in the same way with different inputs for permitted flow rates and effluent limitations, but the calculations are not shown here.

Scenario 1: Current permitted conditions

	<u>Flow rate</u>		<u>Salt concentration</u>		<u>Salt loading</u>
	(mgd)	(acft/year)	EC (µmhos/cm)	TDS (mg/L)	(ton/year)
Valley Waste	4.3	4,817	1,100	705	4,618
Chevron	18	20,164	1,100	705	19,331
Schafer	1.4	1,568	1,000	641	1,367
surface water		62,500	156	100	8,497
Fertilizer		-	-	-	639
groundwater		18,720	611	392	9,968
total irrigation:		107,769			total salts: 44,420

The table above, taken directly from the Information Sheet, shows currently permitted limits for flow rates and salt concentrations for all dischargers into the CWD irrigation system, plus salts contributed by imported surface water, pumped groundwater, and fertilizer used throughout the CWD. The flow rate is multiplied by the salt concentration to yield an annual salt mass loading rate. After the appropriate unit conversions and summing the salt loading from all six sources, the salt mass loading rate under currently permitted conditions is calculated to be 44,420 tons per year throughout the entire CWD. A sample of the unit conversions for the first row of the table above (for Valley Waste) is shown below:

Valley Waste permitted flow rate = 4.3 mgd

$$flow\ rate = \frac{4.3\ million\ gallons}{day} \times \frac{365\ days}{year} \times \frac{1 \times 10^6\ gallons}{million\ gallons} \times \frac{ft^3}{7.48\ gallons} \times \frac{acft}{43,560\ ft^3} = \frac{4,817\ acft}{year}$$

Valley Waste maximum permitted effluent EC = 1,100 µmhos/cm

First convert EC to TDS using a factor of 0.641:

$$maximum\ TDS = \frac{1,100\ \mu mhos}{cm} \times \frac{0.641}{1} = \frac{705\ mg}{L}\ TDS$$

Then convert mg/L to tons/acft:

$$\text{salt concentration} = \frac{705 \text{ mg}}{\text{L}} \times \frac{\text{lb}}{453,592 \text{ mg}} \times \frac{\text{ton}}{2,000 \text{ lb}} \times \frac{28.32 \text{ L}}{\text{ft}^3} \times \frac{43,560 \text{ ft}^3}{\text{acft}} = \frac{0.959 \text{ ton}}{\text{acft}}$$

Finally, the salt loading rate is the product of the flow rate and salt concentration:

$$\text{salt loading} = \frac{4,817 \text{ acft}}{\text{year}} \times \frac{0.959 \text{ ton}}{\text{acft}} = \frac{4,618 \text{ ton}}{\text{year}}$$

The calculations for the other five sources are carried out in the same way. The salt loading for all six sources are summed to yield the total annual salt loading throughout the CWD. As shown in the table above, the total salt loading in the CWD under Scenario 1 (currently permitted conditions) is 44,420 tons/year.

Next, convert the total mass of salts (above) to mg/year:

$$\text{mass of salt} = \frac{44,420 \text{ tons}}{\text{year}} \times \frac{2,000 \text{ lbs}}{\text{ton}} \times \frac{\text{Kg}}{2.204 \text{ lbs}} \times \frac{1 \times 10^6 \text{ mg}}{\text{Kg}} = \frac{4.03 \times 10^{13} \text{ mg}}{\text{year}}$$

Then convert the aquifer volume (from assumption #3) to L:

$$\text{aquifer volume} = \frac{3,274,617 \text{ acft}}{1} \times \frac{43,560 \text{ ft}^3}{\text{acft}} \times \frac{28.32 \text{ L}}{\text{ft}^3} = 4.04 \times 10^{12} \text{ L}$$

Next, in accordance with assumption #2, assume complete mixing and calculate the annual incremental salinity increase by dividing the mass of salt by the estimated volume of the aquifer:

$$\frac{4.03 \times 10^{13} \text{ mg / year}}{4.04 \times 10^{12} \text{ L}} = 9.98 \text{ mg / L per year}$$

Finally, concentrations of salt can be converted into EC using the factor of 0.641 again as follows:

$$\frac{9.98 \text{ mg}}{\text{L}} \text{ per year} \times \frac{1}{0.641} = 15.57 \mu\text{mhos / cm per year} \approx 16 \mu\text{mhos / cm per year}$$

Using the same method of calculations, the potential impact of discharges under proposed permit limits (Scenario 2) on underlying groundwater is 18 $\mu\text{mhos/cm}$ per year.

CWD – COMMENT #14: CWD disagrees with the fourth sentence in the second paragraph on page 12 of the Information Sheet regarding the effectiveness of the current groundwater

monitoring program for determining the impacts of irrigation practices on the quality of groundwater. CWD requests that this section be rewritten.

RESPONSE: See response to Comment #5.

CWD – COMMENT #15: CWD states that it believes that no further action is required under CEQA for the proposed increases of flow rates and EC limits from the VWDC discharge into Reservoir B.

RESPONSE: Oil production wastewater from Kern Front oil fields is discharged to settling ponds owned and operated by the Valley Waste Disposal Company (VWDC), which provides treatment to remove residual oil waste, then discharges that wastewater to a pond referred to as Reservoir B, which is owned and operated by the Cawelo Water District (CWD). CWD then blends this wastewater with other sources of water and the blended water is used for irrigation water. Some blended water is periodically discharged to Poso Creek. The Regional Board has adopted an NPDES permit that regulates the discharges of wastewater to the ponds and the surface water. The current authorized discharge from the oil fields to Reservoir B is 4.3 mgd. The Discharger has requested that the Regional Board authorize an increase in flow into Reservoir B from 4.3 mgd to 7.4 mgd and allow an increase in monthly average electrical conductivity (EC) from 1,100 $\mu\text{mhos/cm}$ to 1,200 $\mu\text{mhos/cm}$.

The Regional Board is considering the adoption of renewed waste discharge requirements and NPDES permit, but is not proposing at this time to allow the increase in flow without additional information about the impacts of the increased flows and increased EC, including compliance with the California Environmental Quality Act (CEQA). The CWD has commented that CEQA does not apply to the increased flows based on Water Code section 13389, which provides an exception for compliance with CEQA for NPDES permits, Public Resources Code section 21080.5, and the CEQA Guidelines existing facilities exemption at Title 14 California Code of Regulations (CCR) section 15301. The CWD asserts that the Regional Board may proceed with authorizing the increased flows because the available information has already evaluated the impacts of the increased flows.

The Regional Board disagrees with CWD's assertions with respect to CEQA. The exemption in Water Code section 13389 applies to discharges to surface waters. The activity that is regulated by the Regional Board includes discharges to surface waters (Poso Creek) and that portion of the discharge is covered by the CEQA exemption in Water Code section 13389. The activity, however, also includes discharges to ponds and irrigated lands. Those discharges are not covered by Water Code section 13389. Public Resources Code section 21080.5 does not apply to the Regional Board's adoption of waste discharge requirements because the permitting program is not a certified regulatory program. Title 14 CCR section 15301 does not appear to apply to the proposed increase in flow. That section provides an exemption from CEQA for existing facilities where the project involves negligible or no expansion of an existing use. The proposed increase of nearly double the

flow and increase in EC does not appear to involve “negligible or no expansion of an existing use, but appears to be a fairly material increase in flows and concentrations of salinity.