CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER NO. R5-2009-0122

WASTE DISCHARGE REQUIREMENTS
FOR
CITY OF BAKERSFIELD
WASTEWATER TREATMENT PLANT NO. 2
KERN COUNTY

The California Regional Water Quality Control Board, Central Valley Region, (hereafter Central Valley Water Board) finds that:

1. The City of Bakersfield (Discharger) owns and operates Wastewater Treatment Plant No. 2 (WWTP No. 2), an existing wastewater treatment facility (WWTF) that serves the incorporated and unincorporated areas of central, east, northeast, and southeast Bakersfield that are generally east of Highway 99. WWTP No. 2 is west of Mt. Vernon Avenue, about 2.5-miles south of State Route 58, and about 2 miles north of Panama Lane in the southeastern quadrant of Section 9, Township 30 S, Range 28 East, Mount Diablo Base & Meridian, Kern County, as shown on Attachment A, which is attached hereto and made part of this Order by reference.

2. The Discharger submitted a Report of Waste Discharge (RWD) including an Engineering Report in August 2004 in support of a proposed effluent storage expansion and an increase in the discharge of wastewater from WWTP No. 2 to about 5,476 acres of farmland mostly south of the WWTF. The Discharger submitted another RWD in April 2006 in support of reducing the farmland for recycling to 4,196 acres, but still maintaining the proposed monthly average dry weather discharge of 25 million gallons per day (mgd). In its comments to Tentative Waste Discharge Requirements (WDRs), the Discharger now says the entire 5,476 acres will remain available for wastewater recycling.

3. In May 1996, the Discharger submitted a RWD along with a technical report dated August 1996 in support of an increase in the monthly average dry weather discharge up to 25 mgd. In response, the Central Valley Water Board adopted the existing WDRs Order No. 97-104 in June 1997 as well as Cease and Desist Order (CDO) 97-105. The CDO was issued with a time schedule for the Discharger to become compliant with effluent limits in the WDRs. In order to be compliant with the CDO, the Discharger was required to expand and upgrade WWTP No. 2 by January 2000, submit monthly status reports documenting the progress of the expansion activities, and comply with the effluent limits following the expansion activities.

4. In September 2000, the Discharger completed an expansion of the WWTF to increase the daily flow capacity of the plant to 25 mgd. The expansion consisted of adding one additional primary clarifier, three trickling filters, three secondary clarifiers, two sludge digesters with methane recovery and cogeneration systems, and associated pumping equipment. In 2004, an effluent storage expansion project was completed that converted

the four aerated lagoons to one storage pond and expanded another storage pond for a total of nine storage ponds with a capacity of about 6,190 acre feet.

5. Order No. 97-104 is no longer adequate because it does not reflect the current conditions at WWTP No. 2, the expansion project completed in 2000, and the current disposal/recycling practices. The Discharger is now compliant with the terms of CDO 97-105.

Existing Wastewater Treatment Plant

6. The existing treatment system consists of: a headworks, three primary clarifiers, three trickling filters, three secondary clarifiers, nine storage ponds with a capacity of about 6,190 acre feet, four sludge digesters with methane recovery and a cogeneration system (currently only three are in use), and eighteen sludge drying beds.

7. In wet periods when the disposal areas cannot accept the wastewater, effluent is stored in the nine effluent storage ponds at WWTP No. 2. The ponds were constructed with a compacted soil base to minimize percolation of wastewater to the underlying groundwater. The influent flow into WWTP No. 2 since 2005 averaged 14.9 mgd, or about 46 acre feet per day. Influent to WWTF decreased in 2009 through May to an average of 13.6 mgd or about 42 acre feet per day. The current capacity of the storage ponds is about 6,192 acre feet, which would provide about 81 days of storage at 25 mgd and about 135 days at the current average flow rate of 14.9 mgd.

8. Solids removed by the bar screens and materials collected from the grit chamber are disposed of at a sanitary landfill.

9. The RWD and self-monitoring data from January 2007 to June 2009 characterize the flows from WWTP No. 2 as follows:

Monthly Average Flow	14.5 mgd
Design Flow (daily dry weather average)	25.0 mgd
Peak Flow	50 mgd
Highest Monthly Average Flow	15.7 mgd

10. Self-monitoring data from January 2007 to June 2009 characterize the quality of the discharge as follows:

Constituent/Parameter	Units[1]	Influent	Effluent	% Removal[2]
Conventional Pollutants				
BOD[4]	mg/L	449	34	93
TSS[5]	mg/L	509	28	95

(continued next page)

Constituent/Parameter	Units[1]	Influent	Effluent	% Removal[2]
Salts				
Chloride	mg/L	NS[3]	78	--
Sodium	mg/L	NS[3]	83	--
EC[6]	µmhos/cm	NS[3]	750	--
TDS[7]	mg/L	NS[3]	413	--
Nitrogen		NS[3]		
Nitrate as Nitrogen	mg/L	NS[3]	6.0[8]	--
Metals		NS[3]		
Arsenic	µg/L	NS[3]	2.0	--
Lead	µg/L	NS[3]	1.62	--
Copper	µg/L	NS[3]	20	--

[1] mg/L = milligrams per liter; µmhos/cm = micromhos per centimeter; µg/L = micrograms per liter
[2] Percent removal, -- = No data available
[3] Not sampled (NS)
[4] 5-day biochemical oxygen demand (BOD)
[5] Total suspended solids (TSS)
[6] Electrical conductivity at 25ºC (EC)
[7] Total dissolved solids (TDS)
[8] Data reported as Nitrate. Converted to nitrate as nitrogen by dividing by a factor of 4.5.
[9] Calculated by adding nitrate as nitrogen and total Kjeldahl nitrogen (TKN)

11. The EC of WWTP No. 2 effluent is typically about 370 micromhos per centimeter (µmhos/cm) greater than source water, which is well below the Basin Plan limit of 500 µmhos/cm plus the EC of the source water. Self monitoring data from January 2007 through May 2009 indicates that the effluent EC concentrations have not exceeded 500 µmhos/cm plus the EC of the source water.

12. The Discharger has a pretreatment program and submits quarterly reports. The United States Environmental Protection Agency approved the Discharger's initial pretreatment program in October 1985 and the State and Regional Water Boards received authority to administer the pretreatment regulations on 25 September 1989. The Discharger's 2007 Annual Pretreatment Report states that 618 inspections were conducted in 2007 that led to 234 sampling events. Based on the observations during the Discharger's inspections and the sample results, the Discharger issued nine notices of violation for exceeding various pretreatment limits.

13. Effluent is recycled to a multi-parcel disposal area located mostly south of WWTP No. 2 as shown in Attachment A. The disposal areas are divided into northern (T30S, R28E) and southern (T31S, R28E) disposal areas. The disposal area is comprised of 23 parcels containing 5,476 acres of farmland for the recycling of wastewater. The WWTP is the farm's only water source. The wastewater is held in the storage ponds until needed for

irrigation. In 2006, approximately 2,500 of the 5,476 acres were in production with about 1,872 acres planted with alfalfa, 659 acres in grain, and 32 acres in corn. Secondary Disinfected Recycled Water is also used at the City of Bakersfield Green Waste Facility.

Sludge Management and Biosolids Disposal

14. Sludge as used herein means the solid, semisolid, and liquid residues generated during the treatment of industrial and domestic sewage in a municipal wastewater treatment facility. Sludge includes solids removed during primary, secondary, or advanced wastewater treatment processes, but not grit or screening material generated at the headworks. Biosolids as used herein means sludge that has undergone treatment and subsequently been tested and shown to be capable of being beneficially useful and legally used pursuant to federal and state regulations as a soil amendment for agriculture, silviculture, horticulture, and land reclamation.

15. Sludge and scum is pumped from the primary clarifiers to three digesters. The Discharger currently dries sludge generated during the treatment process in the 18 onsite unlined sludge drying beds.

16. The Discharger land applies biosolids generated from WWTP No. 2 at its disposal area adjacent to the south and east of WWTP No. 2. The Discharger prepares Annual Land Management reports that document the amount of, and to which fields biosolids are applied. Biosolids discharged to the disposal area are regulated by this Order.

Sanitary Sewer Overflows

17. A “sanitary sewer overflow” is defined as a discharge to ground or surface water from the sanitary sewer system at any point upstream of the plant. Temporary storage and conveyance facilities (such as wet wells, regulated impoundments, tanks, pipes, etc.) may be part of a sanitary sewer system and discharges to these facilities are not considered sanitary sewer overflows, provided that the waste is fully contained within these temporary storage/conveyance facilities.

18. On 2 May 2006, the State Water Resources Control Board (State Water Board) adopted Statewide General Waste Discharge Requirements for Sanitary Sewer Systems General Order No. 2006-003-DWQ (General Order). The General Order requires all public agencies that own or operate sanitary sewer systems greater than one mile in length to comply with the order. The Discharger’s collection system is greater than one mile in length; therefore the General Order is applicable. The Discharger submitted a Notice of Intent (NOI) for coverage under the general permit was submitted to the State Water Resources Control Board in August 2008.

Water Recycling

19. Domestic wastewater contains pathogens harmful to humans that are typically measured by means of total or fecal coliform, as indicator organisms. California Department of Public Health (DPH), which has primary statewide responsibility for protecting public health, has established statewide criteria in Title 22, California Code of Regulations, Section 60301 et seq., (hereafter Title 22) for the use of recycled water and has developed guidelines for specific uses. Revisions of the water recycling criteria in Title 22 became effective on 2 December 2000. The revised Title 22 expands the range of allowable uses of recycled water, establishes criteria for these uses, and clarifies some of the ambiguity contained in the previous regulations.

20. A 1988 Memorandum of Agreement (MOA) between DPH (then called the Department of Health Services) and the State Water Resources Control Board on the use of recycled water establishes basic principles relative to the agencies and the regional water boards. Under terms of the MOA, the Board implements Title 22 and DPH recommendations for the protection of public health. In addition, the MOA allocates primary areas of responsibility and authority between these agencies, and provides for methods and mechanisms necessary to assure ongoing, continuous future coordination of activities relative to the use of recycled water in California.

21. Title 22 requires recyclers of treated municipal wastewater to submit an engineering report detailing the use of recycled water, contingency plans, and safeguards. The Discharger has submitted an engineering report for reclamation of its secondary treated wastewater. Additional evaluation of the potential impacts to the underlying groundwater is necessary as required by Provision H.16.

Site-Specific Conditions

22. WWTP No. 2 is in an arid climate characterized by hot dry summers and mild winters. The rainy season generally extends from November through March. Occasional rains occur during the spring and fall months, but summer months are dry. Average annual precipitation and evaporation in the discharge area are about 6 inches and 58 inches, respectively, according to information published by the California Department of Water Resources.

23. According to the USDA Natural Resources Conservation Service (USDA/NRCS) *Soil Survey, Kern County, Southwest Part,* soils in the vicinity of WWTP No. 2 consist primarily of the Kimberlina fine sandy loam, the Panoche clay loam, the Weedpatch clay loam, and the Garces silt loam.

24. Permeability of the Kimberlina soil is moderate with high available water capacity. The Kimberlina fine sandy loam is described as a Class I soil. Class I soils have few limitations and are suited for a wide range of irrigated crops including almonds, alfalfa, cotton and grapes.

25. Permeability of the Panoche clay loam is moderately slow with moderate to high available water capacity. The Panoche clay loam is described as a Class II s-6 soil. Class II soils have moderate limitations and are reportedly suitable for salt tolerant crops such as cotton, alfalfa, barley sorgum, and sugar beets.

26. The Weedpatch clay loam and the Garces silt loam units are described as a Class III s soils. Class III soils have severe limitations that reduce the choice of crops grown or require special conservation practices. The 's' designates the soil as shallow, droughty, or stony.

27. WWTP No. 2 itself is not within a 100-year floodplain according to Federal Emergency Management Agency Map 06029C2325E. The disposal area located in T30S, R28E, Section 28; a portion of T30S, R28E, Section 22; and all of the disposal areas in T31S, R28E are located within a 100-year flood plain according to Federal Emergency Management Agency Map 06029C2325E. However, because of berms and tailwater control ditches, the disposal areas are islands which are not part of the 100-year flood zone.

28. The Discharger is not required to obtain coverage under a National Pollutant Discharge Elimination System general industrial storm water permit for WWTP No. 2 because all storm water runoff is retained onsite and does not discharge to a water of the United States.

29. Land use in the vicinity of WWTP No. 2 is primarily agricultural, industrial, rural residential, with suburban housing projects encroaching from the north, west, and east. The primary crops grown within five miles of the treatment plant include grain and hay crops, pasture crops such as alfalfa, field crops such as cotton, vineyards, almonds, and native vegetation according to land use maps prepared by the Department of Water Resources. Irrigation water is supplied primarily by surface water.

Groundwater Considerations

30. Since 1982, the Discharger has maintained a groundwater monitoring network consisting of a combination of piezometers, groundwater monitoring wells, and domestic/irrigation supply wells (also called City Wells) to monitor groundwater quality. Available groundwater data dating back to 1952 indicates groundwater quality varies considerably, both seasonally and by location.

31. Various constituents in groundwater both upgradient and downgradient of WWTP No. 2 exceed water quality objectives. However, the cause of the poor water quality does not appear to be attributable to the operation or discharge from WWTP No. 2. Available data indicates water quality in the unconfined aquifer is highly variable. EC concentrations in the supply wells range from about 500 µmhos/cm to over 6,000 µmhos/cm; chloride concentrations range from about 30 mg/L to about 1,120 mg/L; and sodium concentrations range from about 43 mg/L to 660 mg/L. Groundwater data as far back as

1952 (prior to WWTP No. 2) indicate electrical conductivity (EC) concentrations up to 1,300 µmhos/cm downgradient of where WWTP No. 2 is now.

32. Because background water quality exceeds the recommended consumer acceptance contaminant level for EC of 900 µmhos/cm in Title 22 of the California Code of Regulations, this level is not appropriate for setting as a groundwater limit. The more appropriate limit is the upper limit of 1,600 µmhos/cm.

33. The Corcoran Clay is present beneath the southern disposal areas, but not beneath WWTP No. 2 or the northern disposal areas. This results in groundwater occurring in two main aquifers (a discontinuous perched zone and an unconfined aquifer) in the vicinity of WWTP No. 2 and the northern disposal areas, and in three main aquifers (a confined aquifer in addition to the perched and unconfined aquifers) beneath the southern disposal areas.

34. The Discharger currently monitors the shallow or discontinuous perched zone and the unconfined aquifer. It does not appear that the confined zone is directly monitored, although available well construction information indicates some of the wells used to monitor the unconfined aquifer may be set into both the confined and unconfined aquifers. Due to the depth to confined aquifer, the presence of the e-clay where the confined aquifer is present, and the effluent quality, it would not appear that monitoring of the confined aquifer is warranted.

35. The unconfined aquifer is monitored using about 56 domestic/irrigation wells (supply wells) of which 20 are monitored by the Discharger (also called City Wells) and 36 are monitored by the Kern Delta Water District; and 6 groundwater monitoring wells owned by the Kern Sanitation Authority (KSA).

36. The KSA conventional monitoring wells (KSA1 through KSA6) range from 150 to 220 feet in depth and have 40-foot screened intervals. The depth to groundwater in the KSA wells in 2007 ranged from about 106 to 162 feet bgs. Based on the KSA wells, the direction of groundwater flow at WWTP No. 2 is somewhat variable due to the mounding caused by the existing storage/percolation basins, but is predominantly to the east/southeast.

Source Water Quality

37. Water is supplied to the WWTP No. 2 service area by up to approximately 87 wells and is of good to excellent quality. The 12-month weighted average for 2007 was 378 µmhos/cm. The City of Bakersfield provides Consumer Confidence Reports to residents that show water quality results for the Bakersfield area. The following table includes excerpts of the City of Bakersfield's 2007 Annual Water Quality Report. These values are averages of all of the wells supplying water for the City of Bakersfield, not just those that supply water in the area serviced by WWTP No. 2, and hence, the average EC value is slightly different than that calculated for WWTP No. 2, but within the range reported.

Constituent/Parameter	Units	Average	Range
Chloride	mg/L	21	6–82
Sodium	mg/L	31	14–97
EC	µmhos/cm	290	160–730
Nitrate (as NO_3)	mg/L	4.8	ND–23
TDS	mg/L	178	98–450

Basin Plan, Beneficial Uses, and Water Quality Objectives

38. The *Water Quality Control Plan for the Tulare Lake Basin, 2nd Edition*, (hereafter Basin Plan) designates beneficial uses, establishes numerical and narrative 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 Water Board. Pursuant to Section 13263(a) of the California Water Code (CWC), these waste discharge requirements implement the Basin Plan.

39. Water in the Tulare Lake Basin is in short supply, requiring importation of surface water from other parts of the State. The Basin Plan encourages recycling on irrigated crops wherever feasible and indicates that evaporation of recyclable wastewater is not an acceptable permanent disposal method where the opportunity exists to replace existing uses or proposed use of fresh water with recycled water.

40. WWTP No. 2 is in Detailed Analysis Unit (DAU) No. 254 within the Kern County Basin. The Basin Plan designates the beneficial uses of groundwater in this DAU as municipal and domestic supply, agricultural supply, industrial process and service supply, water contact recreation, and wildlife habitat.

41. WWTP No. 2 is in the South Valley Floor Hydrologic Unit and the Kern Delta Hydrologic Area. The Basin Plan designates the beneficial uses of surface water (Valley Floor Waters) as agricultural supply; industrial process and service supply; water contact recreation; non-contact water recreation; warm freshwater habitat; wildlife habitat; rare, threatened, or endangered species; and groundwater recharge.

42. The Basin Plan includes a water quality objective for chemical constituents that, at a minimum, require waters designated as domestic or municipal supply to meet the applicable MCLs specified in Title 22. The Basin Plan recognizes that the Regional Water Board may apply limits more stringent than MCLs to ensure that waters do not contain chemical constituents in concentrations that adversely affect beneficial uses.

43. The Basin Plan establishes narrative water quality objectives for Chemical Constituents, Tastes and Odors, and Toxicity. The Toxicity objective, in summary, requires that groundwater be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life associated

with designated beneficial uses. Quantifying a narrative water quality objective requires a site-specific evaluation of those constituents that have the potential to impact water quality and beneficial uses.

44. The Basin Plan identifies the greatest long-term water quality problem facing the entire Tulare Lake Basin as the increase in salinity in groundwater, which has been accelerated due to man's activity. The Basin Plan recognizes that degradation is unavoidable until there is a long-term solution to the salt imbalance. Until then, the Basin Plan establishes several salt management requirements, including:

    a. The incremental increase in salts from use and treatment must be controlled to the extent possible or limited to a maximum of 1,000 µmhos/cm. The maximum EC shall not exceed the EC of the source water plus 500 µmhos/cm. When the source water is from more than one source, the EC shall be a weighted average of all sources.

    b. Discharges to areas that may recharge good quality groundwaters shall not exceed an EC of 1,000 µmhos/cm, a chloride content of 175 mg/L, or boron content of 1.0 mg/L.

45. The list of crops in Finding 29 is not intended as a definitive inventory of crops that are or could be grown in the area affected by the discharge, but is representative. Crops sensitive to salt and boron are currently not being grown in the area.

46. The Basin Plan requires municipal wastewater treatment facilities that discharge to land to comply with treatment performance standards for BOD and TSS. Facilities that preclude public access and are greater than one (1) mgd must provide removal of 80 percent or reduction to 40 mg/L, whichever is more restrictive, of both BOD_5 and TSS.

Antidegradation

47. State Water Board Resolution 68-16 (the Antidegradation Policy) requires that the Central Valley Water Board, in regulating the discharge of waste, must maintain the high quality of waters of the state until it is demonstrated that any change in quality will be consistent with the 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 Central Valley Water Board's policies (e.g., quality that exceeds water quality objectives). Resolution 68-16 also requires that waste discharged to high quality water be required to meet WDRs that will result in the best practicable treatment or control of the discharge. Resolution 68-16 prohibits degradation of groundwater quality as it existed in 1968, or at any time thereafter that the groundwater quality was better than in 1968, other than degradation that was previously authorized. An antidegradation analysis is required for an increased volume or concentration of waste.

48. 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 impact 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 the terms of the Basin Plan are met.

49. For salinity, the Basin Plan contains effluent limits (EC of SW + 500 µmhos/cm, 1,000 umhos/cm max). Background groundwater quality (based on City Well No. 2) is approximately 500 µmhos/cm, while effluent concentrations average about 740 µmhos/cm indicating degradation might occur from percolation of wastewater. However, data as far back as 1951 indicates EC concentrations as high as 1,300 µmhos/cm in wells downgradient of WWTP No. 2 indicating the elevated EC concentrations downgradient of WWTP No. 2 existed prior to the construction of the plant.

50. Sodium exceeds the most stringent agricultural limit of 69 mg/l for spray irrigated salt sensitive crops. Background sodium concentrations (based on City Well No. 2) are about 40 mg/L, while sodium concentrations in effluent average about 81 mg/L indicating some degradation could occur. However, review of various reports (USDA, *Soil Survey of Kern County: Northwestern Part*; Ayers and Westcott, *Water Quality for Agriculture*; Asano, *Wastewater Reclamation and Reuse*) and land use maps showing crops grown in the region, indicates soils in the area are not conducive to growing salt-sensitive crops, and that salt sensitive crops are not grown in the area.

    Ayers and Westcott indicate sodium concentrations up to 70 mg/L have no restrictions for salt-sensitive crops and concentrations from 70 to 210 mg/L have only slight to moderate restrictions. The average sodium concentration in effluent from WWTP No. 3 has been about 83 mg/L since 2007 and was about 78 mg/L in 2008. Based on this information and the information presented in Findings 24 through 26, the sodium concentration in the discharge will not unreasonably affect the receiving groundwater's present and anticipated beneficial uses for agricultural or drinking water or result in groundwater quality exceeding water quality objectives.

51. In general, the current discharge will have less impact on water quality than the previously permitted discharge, as summarized below.

    a. Nitrate as nitrogen concentrations are less than the Primary MCL of 10 mg/L;

    b. EC values average about 750 µmhos/cm, which is less than the Secondary MCL of 900 µmhos/cm;

    c. Sodium concentrations average about 80 mg/L, which does not restrict usage for the area's agriculture or as a drinking water source.

52. This Order establishes new groundwater limits for WWTP No. 2 that will not unreasonably threaten present and anticipated beneficial uses or result in groundwater quality that

exceeds water quality objectives set forth in the Basin Plan. This Order contains requirements for a groundwater assessment for assuring that the highest water quality consistent with the maximum benefit to the people of the State will be achieved.

Treatment and Control Practices

53. WWTP No. 2 provides treatment and control of the discharge that incorporates:
    a. Alarms and operational procedures to minimize and prevent bypass or overflow;
    b. Secondary treatment of up to 25 mgd of wastewater;
    c. Recycling of wastewater on crops and landscaping;
    d. Odor control;
    e. An Industrial Pretreatment program;
    f. Appropriate biosolids disposal practices; and
    g. The use of certified operators to ensure proper operation and maintenance.

Other Regulatory Considerations

54. The United States Environmental Protection Agency (EPA) has promulgated biosolids reuse regulations in Title 40, Code of Federal Regulations, Part 503, Standards for the Use or Disposal of Sewage Sludge, which establishes management criteria for protection of ground and surface waters, sets application rates for heavy metals, and establishes stabilization and disinfection criteria. The Discharger may have separate and/or additional compliance, reporting, and permitting responsibilities to EPA.

55. The California Department of Water Resources sets standards for the construction and destruction of groundwater wells, as described in the *California Well Standards Bulletin 74-90* (June 1991) and *Water Well Standards*: *State of California Bulletin 94-81 (December 1981).* These standards and any more stringent standards adopted by the state or county pursuant to CWC Section 13801, apply to all monitoring wells.

56. The Discharger treats the wastewater to secondary treatment standards and reduces nitrates to less than primary drinking water standards and the effluent is stored for reuse by irrigation of crops, which will provide further reduction in pollutants (primarily nitrates). The effluent EC (750 µmhos/cm) is similar to background water quality, which ranges from 500 to 6,000 µmhos/cm. The discharge should not cause groundwater to exceed the upper consumer acceptance contaminant level for EC of 1,600 µmhos/cm, which is the appropriate groundwater limitation given the background groundwater quality and agriculture in the area. The pond bottoms have been compacted to minimize seepage. For these reasons, the discharge is exempt from *Consolidated Regulations for Treatment, Storage, Processing, or Disposal of Solid Waste*, as set forth in Title 27, CCR, Division 2, Suibdivision 1, Section 20005, et seq., (Title 27).

CEQA

57. In 1990, the Discharger adopted a Negative Declaration for a plant expansion project in September 1990 in accordance with the California Environmental Quality Act. In September 2000, the Discharger completed an expansion of the WWTF to increase the daily flow capacity of the plant to 25 mgd. In 2004, an effluent storage expansion project was completed, that allowed the Discharge of to 5,476 acres of nearby farmland.

58. This Order implements measures necessary to mitigate any adverse impacts to groundwater from WWTP No. 2 to less than significant levels, including:

    a. Effluent Limit B.4, which stipulates waste constituents cannot be released or discharged in a concentration or mass that causes violation of the Order's groundwater limitations.

    b. Effluent Limit B.1, which establish effluent limitations consistent with the Basin Plan's performance standards.

    c. Provision H.12, which requires the Discharger to comply with the effluent total nitrogen limitation of 10 mg/L (Effluent Limitation B.2), or alternatively, the Discharger shall submit a design report and performance demonstration for the storage ponds.

General Findings

59. Based on the threat and the complexity of the discharge, the facility has been determined to be classified 2-A as defined below:

    a. Category 2 threat to water quality, defined as, "Those discharges of waste that could impair the designated beneficial use of the receiving water, cause short term violation of water quality objectives, cause secondary drinking water standards to be violated, or cause a nuisance."

    b. Category A complexity, defined as, "Any discharges of toxic wastes, any small volume discharge containing toxic waste or having numerous discharge points or groundwater monitoring, or and Class 1 waste management unit."

60. Pursuant to CWC Section 13263(g), discharge is a privilege, not a right, and adoption of this Order does not create a vested right to continue the discharge.

61. The Regional Water Board will review this Order periodically and will revise requirements when necessary.

62. California Water Code Section 13267(b) states that: "In conducting an investigation specified in subdivision (a), the Regional Water Board may require that any person who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge waste within its region, or any citizen or domiciliary, or political agency or entity of this state who has discharged, discharges, or is suspected of having

discharged or discharging, or who proposes to discharge, waste outside of its region that could affect the quality of waters within its region shall furnish, under penalty of perjury, technical or monitoring program reports which the Regional Water Board requires. The burden, including costs, of these reports shall bear a reasonable relationship to the need for the report and the benefits to be obtained from the reports. In requiring those reports, the Regional Water Board shall provide the person with a written explanation with regard to the need for the reports, and shall identify the evidence that supports requiring that person to provide the reports."

63. The technical reports required by this Order and the attached Monitoring and Reporting Program No. R5-2009-0122 are necessary to assure compliance with these waste discharge requirements. The Discharger operates the Facility that discharges the waste subject to this Order.

Public Notice

64. All the above and the supplemental information and details in the attached Information Sheet, which is incorporated by reference herein, were considered in establishing the following conditions of discharge.

65. The Discharger and interested agencies and persons have been notified of the intent to prescribe waste discharge requirements for this discharge, and they have been provided an opportunity for a public hearing and an opportunity to submit their written views and recommendations.

66. All comments pertaining to the discharge were heard and considered in a public meeting.

IT IS HEREBY ORDERED that Waste Discharge Requirements Order No. 97-104 is rescinded and that, pursuant to Sections 13263 and 13267 of the CWC, the City of Bakersfield and its agents, successors, and assigns, in order to meet the provisions contained in Division 7 of the CWC and regulations adopted thereunder, shall comply with the following:

A. Discharge Prohibitions

1. Discharge of wastes to surface waters or surface water drainage courses is prohibited.

2. Bypass or overflow of untreated wastes, except as allowed by Provision E.2 of Standard Provisions and Reporting Requirements, is prohibited.

3. Discharge of waste classified as 'hazardous', as defined in Section 2521(a) of Title 23, California Code of Regulations, Section 2510 et seq., is prohibited. Discharge of waste classified as 'designated,' as defined in California Water Code Section 13173, in a manner that causes violation of groundwater limitations, is prohibited.

B. Effluent Limitations

1. The discharge to the storage ponds and/or the disposal areas shall not exceed the following limitations:

Constituent	Units	Monthly Average	Daily Maximum
BOD[1]	mg/L	40	80
TSS	mg/L	40	80

[1] Five-day biochemical oxygen demand

The arithmetic mean of BOD and TSS in effluent samples collected over a monthly period shall not exceed 20 percent of the arithmetic mean of the values for influent samples collected at the same times during the same period (80 percent removal).

2. The monthly average concentration of total nitrogen in the discharge shall not exceed 10 mg/L, or alternatively, the Discharger shall submit a design report and performance demonstration for effluent contained in the storage ponds. The performance demonstration shall establish that the pond design will be protective of groundwater quality and that seepage from the ponds will not contribute to nitrogen or EC (TDS) in groundwater exceeding groundwater limitations.

3. The 12-month rolling average EC of the discharge shall not exceed the 12-month rolling average EC of the source water plus 500 µmhos/cm. Compliance with this effluent limitation shall be determined monthly.

4. No waste constituent shall be released or discharged, or placed where it will be released or discharged, in a concentration or in a mass that causes violation of groundwater limitations.

C. Discharge Specifications

1. The monthly average discharge flow shall not exceed 25 mgd.

2. All conveyance, treatment, storage, and disposal units shall be designed, constructed, operated, and maintained to prevent inundation or washout due to floods with a 100-year return frequency.

3. Public contact with effluent shall be precluded through such means as fences, signs, or acceptable alternatives.

4. Objectionable odors shall not be perceivable beyond the limits of WWTP No. 2 property at an intensity that creates or threatens to create nuisance conditions.

5. Effluent disposal ponds shall have sufficient capacity to accommodate allowable wastewater flow and design seasonal precipitation and ancillary inflow and infiltration

during the winter. Design seasonal precipitation shall be based on total annual precipitation using a return period of 100 years, distributed monthly in accordance with historical rainfall patterns.

6. On or about **1 October** of each year, available disposal pond storage capacity shall at least equal the volume necessary to comply with Discharge Specification C.5.

7. Ponds shall be managed to prevent breeding of mosquitoes. In particular,

   a. An erosion control plan should assure that coves and irregularities are not created around the perimeter of the water surface.

   b. Weeds shall be minimized through control of water depth, harvesting, and herbicides.

   c. Dead algae, vegetation and other debris shall not accumulate on the water surface.

   d. Vegetation management operations in areas in which nesting birds have been observed shall be carried out either before or after, but **not during**, the April 1 to June 30 bird nesting season.

D. Recycling Specifications

The following specifications apply to use areas under the ownership or control of the Discharger. Other use areas are covered by separate water recycling requirements.

1. Recycled water shall be managed in conformance with the regulations contained in Title 22, Division 4, Chapter 3, CCR.

2. Use of Secondary Recycled Water shall be limited to flood irrigation of fodder, fiber, seed crops not eaten by humans or for grazing of non-milking cattle and shall comply with the provisions of Title 22.

3. All reclamation equipment, pumps, piping, valves, and outlets shall be appropriately marked to differentiate them from potable facilities. All reclamation distribution system piping shall be purple or adequately wrapped with purple tape.

4. Recycled water controllers, valves, and similar appurtenances shall be affixed with recycled water warning signs, and shall be equipped with removable handles, locking mechanisms, or some other means to prevent public access or tampering. The contents of the signs shall conform to Title 22, CCR, Section 60310. Quick couplers and sprinkler heads, if used, shall be of a type, or secured in a manner, that permits operation only by authorized personnel. Hose bibs that the public could use shall be eliminated.

5. Public contact with recycled water shall be controlled using signs and/or other appropriate means. All areas where recycled water is used that are accessible to the public shall be posted with signs that are visible to the public, in a size no less than 4 inches high by 8 inches wide, that include the following wording: “RECYCLED WATER – DO NOT DRINK, AGUA DE DESPERDICIO RECLAMADA – NO TOME” Each sign shall display an international symbol similar to that shown in Attachment B which is attached hereto and made part of this Order by reference.

6. Recycled water shall not be allowed to escape from the authorized use areas by airborne spray or by surface flow except in minor amounts such as that associated with good irrigation practices.

7. Spray, mist, or runoff shall not enter dwellings, designated outdoor eating areas, or food handling facilities.

8. Drinking water fountains shall be protected against contact with recycled water spray, mist, or runoff.

9. Workers shall be educated regarding proper hygienic procedures to ensure personal and public safety.

10. Potable water mains shall be separated by a clear horizontal distance of at least four feet from, and a clear vertical distance of at least one foot above, any parallel pipeline conveying disinfected tertiary recycled water, and shall be separated by a clear vertical distance of at least one foot above any crossing pipeline conveying disinfected tertiary recycled water, except as may be otherwise allowed or approved under DPH regulatory requirements or DPH design guidance documents. All separation distances shall be measured from the nearest outside edge of each pipe. Vertical separation distances shall apply wherever the horizontal separation distance is eleven feet or less.

11. Potable water supply piping and recycled water piping shall not have any cross-connections. Supplementing recycled water with potable water shall not be allowed except through an air-gap separation or, if approved by the DPH, a reduced pressure principle backflow device.

12. Application of recycled water to recycled water use areas shall not exceed the nitrogen or hydraulic loading reasonably necessary to satisfy the nitrogen or water uptake needs of the use area considering the plant, soil, climate, and irrigation management system (i.e., generally accepted agronomic rates).

13. Areas irrigated with recycled water shall be managed to prevent breeding of mosquitoes. More specifically:

    a. All applied irrigation water must infiltrate completely within 48 hours.

b. Ditches receiving irrigation runoff not serving as wildlife habitat should be maintained free of emergent, marginal, and floating vegetation.

c. Low-pressure and un-pressurized pipelines and ditches, which are accessible to mosquitoes, shall not be used to store recycled water.

14. Excessive irrigation with recycled water that results in excessive runoff of recycled water, or continued irrigation of recycled water during periods of rain is prohibited. Overspray or runoff associated with normal sprinkler use shall be minimized.

15. The Discharger shall maintain the following setback distances from areas where Secondary Recycled Water is impounded or irrigated with:

Setback Distance (feet)	To
15	Property Line
20	Public Roads
50	Drainage courses
100	Irrigation wells
150	Domestic wells

16. Any irrigation runoff shall be confined to the recycled water use area, and shall not enter any surface water drainage course or stormwater drainage system unless the runoff does not pose a public health threat and is authorized by the regulatory agency.

E. Sludge Specifications

1. Sludge and solid waste shall be removed from screens, sumps, aeration basins, ponds, clarifiers, etc. as needed to ensure optimal plant operation.

2. Any handling and storage of residual sludge, solid waste, and biosolids on property of WWTP No. 2 shall be temporary (i.e., no longer than two years) and controlled and contained in a manner that minimizes leachate formation and precludes infiltration of waste constituents into soils in a mass or concentration that will violate groundwater limitations of this Order.

3. Residual sludge, biosolids, and solid waste shall be disposed of in a manner approved by the Executive Officer and consistent with Title 27.

4. Biosolids shall comply at the time of application with either Class A or Class B pathogen reduction standards as listed in 40 CFR 503.

5. Biosolids shall comply with one of the vector attraction reduction standards as listed in 40 CFR 503.33.

6. Biosolids shall not be applied to land in amounts which cause the following cumulative loadings to be exceeded:

	Cumulative Loadings	
Constituent	Kilograms per hectare	Pounds per acre
Arsenic	41	37
Cadmium	39	35
Copper	1500	1338
Lead	300	267
Mercury	17	15
Nickel	420	374
Selenium	100	89
Zinc	2800	2498

7. Biosolids shall not be applied during periods of heavy rainfall or when the ground is saturated.

8. If applied to land, Biosolids shall be fully incorporated into the soil and tillage practices shall minimize the erosion of soil from the application site by wind, storm water, recycled water, or irrigation water.

9. Removal for further treatment, disposal, or reuse at sites (i.e., landfill, composting sites, soil amendment sites) operated in accordance with valid waste discharge requirements issued by a regional water quality control board will satisfy this specification.

10. Other use of biosolids as a soil amendment shall comply with valid waste discharge requirements issued by a regional water quality control board or State Water Board or a local (e.g., county) program authorized by a regional water quality control board. In most cases, this means the General Biosolids Order (State Water Board Water Quality Order No. 2004-12-DWQ, “General Waste Discharge Requirements for the Discharge of Biosolids to Land for Use as a Soil Amendment in Agricultural, Silvicultural, Horticultural, and Land Reclamation Activities”). For a biosolids use project to be authorized by the General Biosolids Order, the Discharger must file a complete Notice of Intent and receive a Notice of Applicability for each project.

11. Any proposed change in sludge use or disposal practice shall be reported in writing to the Executive Officer at least 90 days in advance of the change.

F. Pretreatment Requirements

1. The Discharger shall implement the necessary legal authorities, programs, and controls to ensure that the following incompatible wastes are not introduced to the treatment system, where incompatible wastes are:
   a. Wastes that create a fire or explosion hazard in the treatment works;
   b. Wastes that will cause corrosive structural damage to treatment works, but in no case wastes with a pH lower than 5.0, unless the works is specially designed to accommodate such wastes;
   c. Solid or viscous wastes in amounts that cause obstruction to flow in sewers, or which cause other interference with proper operation or treatment works;
   d. Any waste, including oxygen demanding pollutants (BOD, etc.), released in such volume or strength as to cause inhibition or disruption in the treatment works, and subsequent treatment process upset and loss of treatment efficiency;
   e. Heat in amounts that inhibit or disrupt biological activity in the treatment works, or that raise influent temperatures above 40°C (104°F), unless the treatment works is designed to accommodate such heat;
   f. Petroleum oil, nonbiodegradable cutting oil, or products of mineral oil origin in amounts that will cause interference or pass through;
   g. Pollutants that result in the presence of toxic gases, vapors, or fumes within the treatment works in a quantity that may cause acute worker health and safety problems; and
   h. Any trucked or hauled pollutants, except at points predesignated by the Discharger.

2. The Discharger shall implement the legal authorities, programs, and controls necessary to ensure that indirect discharges do not introduce pollutants into the sewerage system that, either alone or in conjunction with a discharge or discharges from other sources:
   a. Flow through the system to the receiving water in quantities or concentrations that cause a violation of this Order, or
   b. Inhibit or disrupt treatment processes, treatment system operations, or sludge processes, use, or disposal and either cause a violation of this Order or prevent sludge use or disposal in accordance with this Order.

G. Groundwater Limitations

1. Release of waste constituents from any treatment or storage component associated with WWTP No. 2 shall not cause or contribute to groundwater:
   a. Containing concentrations of constituents identified below, or background quality, whichever is greater.
      (i) Nitrate as nitrogen of 10 mg/L.
      (ii) Electrical Conductivity of 1,600 µmhos/cm.
      (iii) Total Coliform Organisms of 2.2 MPN/100 mL.
      (iv) For constituents identified in Title 22, the Primary and Secondary MCLs quantified therein.
   b. Containing taste or odor-producing constituents, toxic substances, or any other constituents, in concentrations that cause nuisance or adversely affect beneficial uses.

H. Provisions

1. The Discharger shall comply with the Standard Provisions and Reporting Requirements for Waste Discharge Requirements, dated 1 March 1991, which are part of this Order. This attachment and its individual paragraphs are referred to as Standard Provisions(s).

2. The Discharger shall comply with Monitoring and Reporting Program (MRP) No. R5-2009-0122, which is part of this Order, and any revisions thereto as adopted by the Regional Water Board or approved by the Executive Officer. The submittal date shall be no later than the submittal date specified in the Monitoring and Reporting Program for Discharger self-monitoring reports.

3. The Discharger shall keep at WWTP No. 2, a copy of this Order, including its MRP, Information Sheet, attachments, and Standard Provisions, for reference by operating personnel. Key operating personnel shall be familiar with its contents.

4. The Discharger shall not allow pollutant-free wastewater to be discharged into the Facility collection, treatment, and disposal systems in amounts that significantly diminish the system's capability to comply with this Order. Pollutant-free wastewater means storm water (i.e., inflow), groundwater (i.e., infiltration), cooling waters, and condensates that are essentially free of pollutants.

5. The Discharger must at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) that are installed or used by the Discharger to achieve compliance with the conditions of this Order. Proper operation and maintenance also include adequate laboratory controls and

appropriate quality assurance procedures. This Provision requires the operation of back-up or auxiliary facilities or similar systems that are installed by the Discharger only when the operation is necessary to achieve compliance with the conditions of the Order.

6. All technical reports and work plans required herein that involve planning, investigation, evaluation, or design, or other work requiring interpretation and proper application of engineering or geologic sciences, shall be prepared by or under the direction of persons registered to practice in California pursuant to California Business and Professions Code sections 6735, 7835, and 7835.1. To demonstrate compliance with sections 415 and 3065 of Title 16, CCR, all technical reports must contain a statement of the qualifications of the responsible registered professional(s). As required by these laws, completed technical reports and work plans must bear the signature(s) and seal(s) of the registered professional(s) in a manner such that all work can be clearly attributed to the professional responsible for the work.

7. The Discharger must comply with all conditions of this Order, including timely submittal of technical and monitoring reports as directed by the Executive Officer. Accordingly, the Discharger shall submit to the Regional Water Board on or before each report due date the specified document or, if an action is specified, a written report detailing evidence of compliance with the date and task. If noncompliance is being reported, the reasons for such noncompliance shall be stated, plus an estimate of the date when the Discharger will be in compliance. The Discharger shall notify the Regional Water Board by letter when it returns to compliance with the time schedule. Violations may result in enforcement action, including Regional Water Board or court orders requiring corrective action or imposing civil monetary liability, or in revision or rescission of this Order.

8. In the event of any change in control or ownership of land or waste treatment and storage facilities presently owned or controlled by the Discharger, the Discharger shall notify the succeeding owner or operator of the existence of this Order by letter, a copy of which shall be immediately forwarded to the appropriate Regional Water Board office.

9. To assume operation under this Order, the succeeding owner or operator must apply in writing to the Executive Officer requesting transfer of the Order. The request must contain the requesting entity's full legal name, the state of incorporation if a corporation, the address and telephone number of the persons responsible for contact with the Regional Water Board and a statement. The statement shall comply with the signatory paragraph of Standard Provision B.3 and state that the new owner or operator assumes full responsibility for compliance with this Order. Failure to submit the request shall be considered a discharge without requirements, a violation of the California Water Code. If approved by the Executive Officer, the transfer request will

be submitted to the Regional Water Board for its consideration of transferring the ownership of this Order at one of its regularly scheduled meetings.

10. As a means of discerning compliance with Discharge Specification C.4, the dissolved oxygen (DO) content in the upper one foot of any wastewater pond shall not be less than 1.0 mg/L for three consecutive days. Should the DO be below 1.0 mg/L during a weekly sampling event, the Discharger shall take all reasonable steps to correct the problem and commence daily DO monitoring in all affected ponds until the problem has been resolved. If unpleasant odors originating from affected ponds are noticed in developed areas, or if the Discharger receives one or more odor complaints, the Discharger shall report the findings in writing within 5 days of that date and shall include and a specific plan to resolve the low DO results to the Regional Water Board within 10 days of that date.

11. The pH of the discharge shall not be less than 6.5 or greater than 8.3 pH units for more than three consecutive sampling events. In the event that the pH of the discharge is outside of this range for more than three consecutive sampling events, the Discharger shall submit a technical evaluation in its monthly SMRs documenting the pH of the discharge to the reclamation area, and if necessary demonstrate that the effect of the discharge on soil pH will not exceed the buffering capacity of the soil profile.

12. By **30 April 2011**, the Discharger shall comply with the effluent total nitrogen limitation of 10 mg/L (Effluent Limitation B.2), or alternatively, the Discharger shall submit a design report and performance demonstration for the storage ponds. The performance demonstration shall establish that the pond design will be protective of groundwater quality and that seepage from the ponds will not contribute to nitrogen or EC (TDS) in groundwater exceeding groundwater limitations. This provision will be considered satisfied following written acknowledgement from the Executive Officer.

13. The Discharger shall maintain and operate all ponds sufficient to protect the integrity of containment levees and prevent overtopping or overflows. Unless a California civil engineer certifies (based on design, construction, and conditions of operation and maintenance) that less freeboard is adequate, the operating freeboard in any pond shall never be less than two feet (measured vertically). As a means of management and to discern compliance with this Provision, the Discharger shall install and maintain in each pond permanent markers with calibration that indicates the water level at design capacity and enables determination of available operational freeboard.

14. The Discharger shall submit the technical reports and work plans required by this Order for Regional Water Board staff consideration and incorporate comments they may have in a timely manner, as appropriate. The Discharger shall proceed with all work required by the following provisions by the due dates specified.

15. **By 5 June 2010,** the Discharger shall, for each separately owned parcel where wastewater and/or biosolids are applied for irrigation or soil amendment purposes, develop and implement management practices that control nutrient losses and describe these in a Nutrient Management Plan, which shall include at a minimum:

    (a) a description of the disposal area and storage facilities;

    (b) a description of the types of crops to be grown and their water and nutrient uptake rates;

    (c) supporting data and calculations for monthly and annual water and nutrient balances;

    (d) management practices that will ensure wastewater, irrigation water, and commercial fertilizers are applied at agronomic rates;

    (e) a coordinated sampling and analysis plan for monitoring soils, wastewater, and plant tissue to verify the nutrient balance; and

    (f) a system of record keeping.

16. **By 5 June 2010**, the Discharger shall submit a report that evaluates the existing groundwater monitoring network for its adequacy of monitoring potential impacts to first encountered groundwater of the unconfined groundwater monitoring network. Should additional wells be required, the report shall recommend additional wells to provide adequate coverage of the unconfined aquifer beneath WWTP No. 2 and the disposal areas. By **3 April 2010,** the Discharger shall submit a work plan to evaluate the increasing concentrations observed in well KSA2.

17. **By 5 June 2010,** the Discharger shall conduct a salinity evaluation and submit a salinity minimization plan to identify and implement measures to reduce the salinity in discharge to the extent feasible. The salinity minimization plan shall include a time schedule to implement the identified measures.

I, PAMELA C. CREEDON, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Central Valley Region, on 10 December 2009.

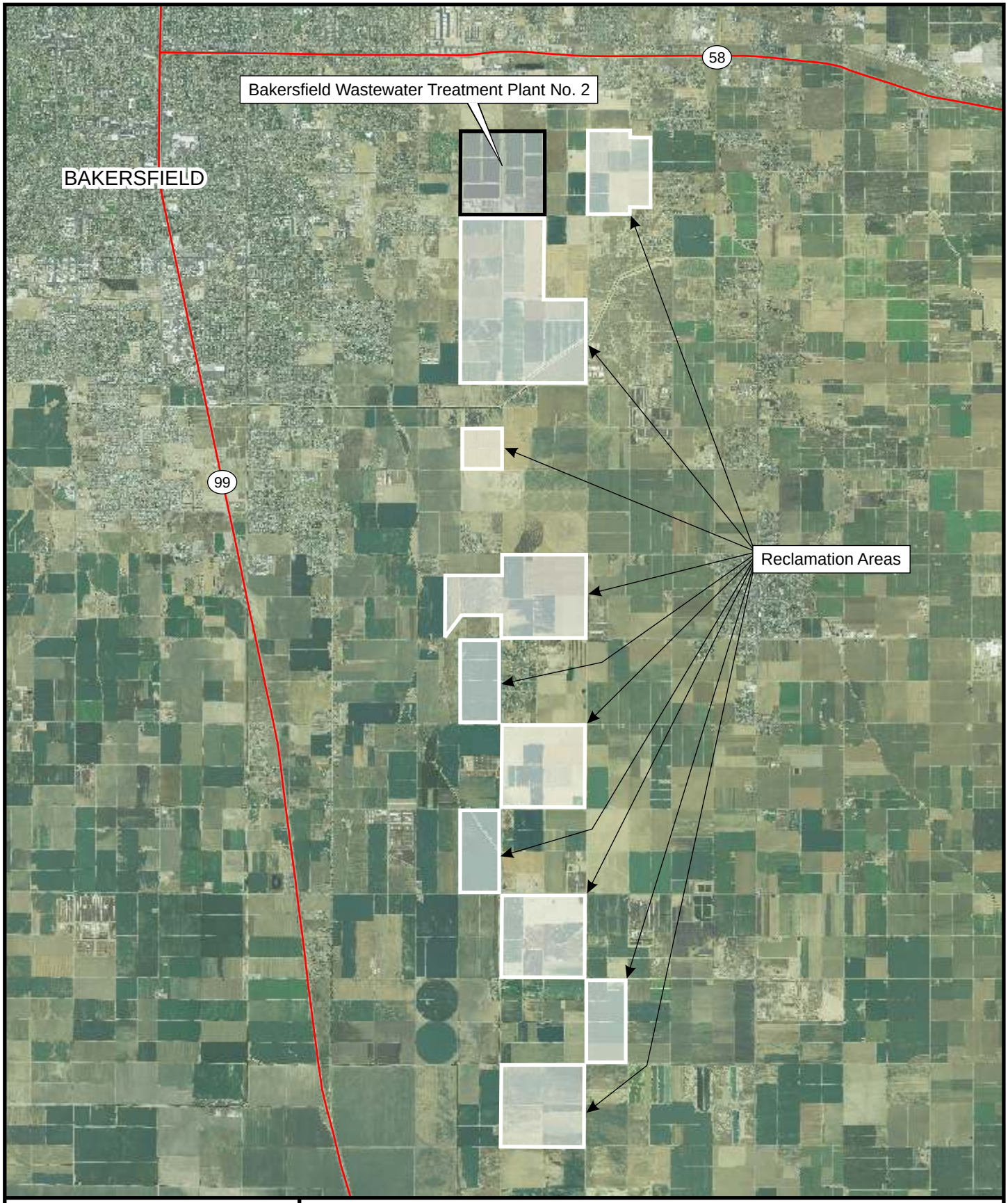
Original signed by:

PAMELA C. CREEDON, Executive Officer

Order Attachments:

Monitoring and Reporting Program
A. Vicinity Map and Disposal Area Map
B. International Symbol for Recycled Water
Standard Provisions (1 March 1991)

JSP/DKP 12/10/2009



Map Source:
NAIP Aerial Photograph (2005)

SCALE OF MILES
0 0.5 1 2

FACILITY AND RECLAMATION AREAS
ORDER NO. R5-2009-0122
WASTE DISCHARGE REQUIREMENTS
FOR
CITY OF BAKERSFIELD
WASTEWATER TREATMENT PLANT NO. 2
KERN COUNTY

ATTACHMENT A

NONPOTABLE WATER INTERNATIONAL SYMBOL

ORDER NO. R5-2009-0122
WASTE DISCHARGE REQUIREMENTS
FOR
CITY OF BAKERSFIELD
WASTEWATER TREATMENT PLANT NO. 2
KERN COUNTY

ATTACHMENT B

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM NO. R5-2009-0122

FOR
CITY OF BAKERSFIELD
WASTEWATER TREATMENT PLANT NO. 2
KERN COUNTY

This Monitoring and Reporting Program (MRP) is required pursuant to California Water Code (CWC) section 13267.

The Discharger shall not implement any changes to this MRP unless and until the Central Valley Water Board adopts, or the Executive Officer issues, a revised MRP. Changes to sample location shall be established with concurrence of Central Valley Water Board staff, and a description of the revised stations shall be submitted for approval by the Executive Officer.

All samples shall be representative of the volume and nature of the discharge or matrix of material sampled. All analyses shall be performed in accordance with ***Standard Provisions and Reporting Requirements for Waste Discharge Requirements***, dated 1 March 1991 (Standard Provisions).

Field test instruments (such as pH) may be used provided that the operator is trained in the proper use of the instrument and each instrument is serviced and/or calibrated at the recommended frequency by the manufacturer or in accordance with manufacturer instructions.

Analytical procedures shall comply with the methods and holding times specified in the following: *Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater* (EPA); *Test Methods for Evaluating Solid Waste* (EPA); *Methods for Chemical Analysis of Water and Wastes* (EPA); *Methods for Determination of Inorganic Substances in Environmental Samples* (EPA); *Standard Methods for the Examination of Water and Wastewater* (APHA/AWWA/WEF); and *Soil, Plant and Water Reference Methods for the Western Region* (WREP 125). Approved editions shall be those that are approved for use by the United States Environmental Protection Agency or the California Department of Public Health's Environmental Laboratory Accreditation Program). The Discharger may propose alternative methods for approval by the Executive Officer.

If monitoring consistently shows no significant variation in magnitude of a constituent concentration or parameter after at least 12 months of monitoring, the Discharger may request this MRP be revised to reduce monitoring frequency. The proposal must include adequate technical justification for reduction in monitoring frequency.

A glossary of terms used within this MRP is included on page 9 and a list of the constituents required for the monitoring of Priority Pollutants is included in Table 1, which is on page 10.

INFLUENT MONITORING

Influent samples shall be collected at the inlet of the headworks at approximately the same time as the effluent samples. Influent monitoring shall include at least the following:

Frequency	Constituent/Parameter	Units	Sample Type
Continuous	Flow	mgd	Meter
Continuous	pH	pH Units	Meter
Weekly	BOD_5	mg/L	24-hour composite
Weekly	TSS	mg/L	24-hour composite
Monthly	Monthly Average Flow	mgd	Computed

EFFLUENT MONITORING

Effluent samples shall be collected just prior to discharge to the storage reservoirs or to the reclamation areas. Effluent monitoring shall include at least the following:

Frequency	Constituent/Parameter	Units	Sample Type
Daily[1]	pH	pH Units	Grab
Twice Weekly	EC	umhos/cm	24-hour composite[2]
Twice Weekly	BOD_5	mg/L	24-hour composite[2]
Twice Weekly	TSS	mg/L	24-hour composite[2]
Weekly	Total Nitrogen	mg/L	Computed
Monthly	Nitrate as N	mg/L	24-hour composite[2]
Monthly	TKN	mg/L	24-hour composite[2]
Monthly	Ammonia	mg/L	24-hour composite[2]
Annually[3]	General Minerals	mg/L	24-hour composite[2]
Annually[3]	Priority Pollutants (see Table 1)	Varies[3]	Varies

[1] Excluding weekends and holidays.

[2] Time-proportioned composite is acceptable.

[3] Sampling may coincide with timing of pretreatment sampling.

[4] mg/L or ug/L, as appropriate.

POND MONITORING

Effluent pond monitoring shall include at least the following:

Frequency	Constituent/Parameter	Units	Sample Type
Weekly	DO	mg/L[1]	Grab
Weekly	Freeboard	Feet[2]	Observation

[1] DO taken at a depth of one foot.

[2] To nearest tenth of a foot

Permanent markers (e.g., staff gauges) shall be placed in storage ponds. The markers shall have calibrations indicating water level at the design capacity and available operational freeboard.

The Discharger shall inspect the condition of the disposal ponds once per week and write visual observations in a bound logbook. Notations shall include observations of whether weeds are developing in the water or along the bank, and their location; whether dead algae, vegetation, scum, or debris are accumulating on the disposal pond surface and their location; whether burrowing animals or insects are present; and the color of the reservoirs (e.g., dark sparkling green, dull green, yellow, gray, tan, brown, etc.).

UNCONFINED GROUNDWATER MONITORING

After measuring water levels and prior to collecting samples, each monitoring well shall be adequately purged to remove water that has been standing within the well screen and casing that may not be chemically representative of formation water. Depending on the hydraulic conductivity of the geologic setting, the volume removed during purging is typically from 3 to 5 volumes of the standing water within the well casing and screen, or additionally the filter pack pore volume.

The Discharger shall monitor all wells in its Unconfined Groundwater Monitoring Network, and any additional wells installed pursuant to this MRP, for the following:

Frequency	Constituent/Parameter	Units	Sample Type
Quarterly	Depth to groundwater	Feet[1]	Measured
Quarterly	Groundwater Elevation	Feet[2]	Computed
Quarterly	pH	pH Units	Grab
Quarterly	EC	umhos/cm	Grab
Quarterly	Nitrate	mg/L (as N)	Grab
Quarterly	TKN	mg/L	Grab
Quarterly	Ammonia	mg/L	Grab
Quarterly	Total Nitrogen	mg/L	Computed
Quarterly	Total Organic Carbon	mg/L	Grab
Quarterly	Arsenic	ug/L	Grab
Quarterly	Iron	ug/L	Grab

Frequency	Constituent/Parameter	Units	Sample Type
Quarterly	Manganese	ug/L	Grab
Quarterly	General Minerals	mg/L	Grab

SOURCE WATER MONITORING

For each source (either well or surface water supply), the Discharger shall calculate the flow-weighted average concentrations for the specified constituents utilizing monthly flow data and the most recent chemical analysis conducted in accordance with Title 22 drinking water requirements. Alternatively, the Discharger may establish representative sampling stations within the distribution system serving the same area as is served by WWTP No. 2.

Frequency	Constituent/Parameter	Units	Sample Type
Monthly	EC	mg/L	Computed average
Annually	General Minerals	mg/L	Computed average

SLUDGE MONITORING

Sludge shall be sampled for the following constituents:

Arsenic	Lead	Nickel
Cadmium	Mercury	Selenium
Copper	Molybdenum	Zinc
Organic Nitrogen	Ammonia Nitrogen	Total Solids

Monitoring shall be conducted as required in Title 40 of the Code of Federal Regulations (40 CFR), Part 503.8(b)(4). The constituents listed above shall be monitored at the following frequency, depending on volume of sludge generated:

Volume Generated (dry metric tons/year)	Frequency
0 to 290	Annually
290 to 1,500	Quarterly
1,500 to 15,000	Bimonthly (six samples per year)
Greater than 15,000	Monthly

The Discharger shall demonstrate that treated sludge (i.e., biosolids) meets Class A or Class B pathogen reduction levels by one of the methods listed in 40 CFR, Part 503.32.

The Discharger shall track and keep records of the operational parameters used to achieve Vector Attraction Reduction requirements in 40 CFR, Part 503.33(b).

RECLAMATION AREA MONITORING

The Discharger shall perform routine monitoring and loading calculations for each discrete irrigation area within the Reclamation Area. Data shall be collected and presented in tabular format in accordance with Table 2.

In addition, the Discharger shall inspect the Reclamation Area on a weekly basis. Evidence of erosion, field saturation, runoff, of the presence of nuisance conditions (i.e., flies, ponding, etc.) shall be noted in field logs and included as part of the quarterly monitoring reports.

REPORTING

All monitoring results shall be reported in **Quarterly Monitoring Reports** which are due by the first day of the second month after the calendar quarter. Therefore, monitoring reports are due as follows:

First Quarter Monitoring Report:	**1 May**
Second Quarter Monitoring Report:	**1 August**
Third Quarter Monitoring Report:	**1 November**
Fourth Quarter Monitoring Report:	**1 February**.

A transmittal letter shall accompany each monitoring report. The transmittal letter shall discuss any violations that occurred during the reporting period and all actions taken or planned for correcting violations, such as operation or facility modifications. If the Discharger has previously submitted a report describing corrective actions or a time schedule for implementing the corrective actions, reference to the previous correspondence is satisfactory.

The following information is to be included on all monitoring reports, as well as report transmittal letters:

Discharger Name
Facility Name
Monitoring and Reporting Program Number
Contact Information (telephone and email)

In reporting monitoring data, the Discharger shall arrange the data in tabular form so that the date, the constituents, and the concentrations are readily discernible. The data shall be summarized in such a manner that illustrates clearly, whether the Discharger complies with waste discharge requirements.

In addition to the details specified in Standard Provision C.3, monitoring information shall include the method detection limit (MDL) and the Reporting limit (RL) or practical quantitation limit (PQL). If the regulatory limit for a given constituent is less than the RL (or PQL), then any analytical results for that constituent that are below the RL (or PQL) but above the MDL shall be reported and flagged as estimated.

Laboratory analysis reports do not need to be included in the monitoring reports; however, the laboratory reports must be retained for a minimum of three years in accordance with Standard Provision C.3.

All monitoring reports shall comply with the signatory requirements in Standard Provision B.3. Monitoring data or discussions submitted concerning WWTF performance must also be signed and certified by the chief plant operator. If the chief plant operator is not in direct line of supervision of the laboratory function for a Discharger conducting any of its own analyses, reports must also be signed and certified by the chief of the laboratory.

All monitoring reports that involve planning, investigation, evaluation, or design, or other work requiring interpretation and proper application of engineering or geologic sciences, shall be prepared by or under the direction of persons registered to practice in California pursuant to California Business and Professions Code sections 6735, 7835, and 7835.1.

A. All Quarterly Monitoring Reports shall include the following:

Wastewater reporting:

1. The results of influent, effluent, and pond monitoring specified on pages 2 and 3.
2. For each month of the quarter, calculation of the maximum daily flow and the monthly average flow.
3. For each month of the quarter, calculation of the 12-month rolling average EC of the discharge using the EC value for that month averaged with the EC values for the previous 11 months.
4. For each month of the quarter, calculation of the monthly average effluent BOD and TSS concentrations, and calculation of the percent removal of BOD and TSS compared to the influent.
5. A summary of the notations made in the pond monitoring log during each quarter. The entire contents of the log do not need to be submitted.

Groundwater reporting:

1. The results of perched and unconfined groundwater monitoring specified on pages 3 and 4.
2. For each monitoring well, a table showing constituent concentrations for at least five previous years, up through the current quarter.
3. A groundwater contour map based on groundwater elevations for that quarter. The map shall show the gradient and direction of groundwater flow under/around the facility and/or effluent disposal area(s). The map shall also include the locations of monitoring wells and wastewater storage and discharge areas.

Source water reporting

1. For each month of the quarter, calculation of the flow-weighted 12-month rolling average EC of the source water using monthly flow data and the source water EC values for the most recent four quarters.

B. Fourth Quarter Monitoring Reports, in addition to the above, shall include the following:

Pretreatment reporting in accordance with Standard Provision E.7 and describing progress towards correction of any deficiencies noted during audit or pretreatment compliance inspections by the Central Valley Water Board or U.S. EPA. Signed copies of the pretreatment reports shall also be submitted to U.S. EPA, Region 9 and the State Water Board.

Wastewater treatment facility information:

1. The names, certificate grades, and general responsibilities of all persons in charge of wastewater treatment and disposal.
2. The names and telephone numbers of persons to contact regarding the WWTF for emergency and routine situations.
3. A statement certifying when the flow meter and other monitoring instruments and devices were last calibrated, including identification of who performed the calibrations (Standard Provision C.4).
4. A statement whether the current operation and maintenance manual, sampling plan, and contingency plan, reflect the WWTF as currently constructed and operated, and the dates when these documents were last reviewed for adequacy.
5. The results of an annual evaluation conducted pursuant to Standard Provision E.4 and a figure depicting monthly average discharge flow for the previous five calendar years.

Sludge sampling records shall be retained for a minimum of five years in accordance with 40 CFR, Part 503.17. A log shall be kept of sludge quantities generated and of handling, application, and disposal activities. The frequency of entries is discretionary; however, the log should be complete enough to serve as a basis to report sludge monitoring. Sludge reporting shall include:

1. The results of sludge monitoring specified on page 5.
2. The amount of sludge generated that year, in dry metric tons, and the amount accumulated from previous years.
3. Demonstrations of pathogen reduction methods and vector attraction reduction methods, as required in 40 CFR, Parts 503.17 and 503.27, and certifications.
4. A description of disposal methods, including the following information related to the disposal methods used at the WWTF. If more than one method is used, include the percentage of sludge production disposed of by each method.

a. For landfill disposal, include: the name and location of the landfill receiving the sludge, and the Order number of WDRs that regulate it.

b. For land application, include: the location of the site, and the Order number of any WDRs that regulate it.

c. For incineration, include: the name and location of the site where sludge incineration occurs, the Order number of WDRs that regulate the site, the disposal method of ash, and the name and location of the facility receiving ash (if applicable).

d. For composting, include: the location of the site, and the Order number of any WDRs that regulate it.

Reclamation Area reporting

1. The type of crop(s) grown in the Reclamation Area, and the quantified hydraulic and nitrogen loading rates in accordance with Table 2.

2. A summary of the notations made in the Reclamation Area monitoring log during each quarter. The entire contents of the log do not need to be submitted.

The Discharger shall implement the above monitoring program on the first day of the month following adoption of this Order.

Ordered by: *Original signed by:*

PAMELA C. CREEDON, Executive Officer

10 December 2009

(Date)

JSP/DKP: 12/10/2009

GLOSSARY

BOD_5	Five-day biochemical oxygen demand
CBOD	Carbonaceous BOD
DO	Dissolved oxygen
EC	Electrical conductivity at 25° C
FDS	Fixed dissolved solids
NTU	Nephelometric turbidity unit
TKN	Total Kjeldahl nitrogen
TDS	Total dissolved solids
TSS	Total suspended solids
Continuous	The specified parameter shall be measured by a meter continuously.
24-Hour Composite	Unless otherwise specified or approved, samples shall be a flow-proportioned composite consisting of at least eight aliquots.
Daily	Samples shall be collected every day.
Twice Weekly	Samples shall be collected at least twice per week on non-consecutive days.
Weekly	Samples shall be collected at least once per week.
Twice Monthly	Samples shall be collected at least twice per month during non-consecutive weeks.
Monthly	Samples shall be collected at least once per month.
Bimonthly	Samples shall be collected at least once every two months (i.e., six times per year) during non-consecutive months
Quarterly	Samples shall be collected at least once per calendar quarter. Unless otherwise specified or approved, samples shall be collected in January, April, July, and October.
Semiannually	Samples shall be collected at least once every six months (i.e., two times per year). Unless otherwise specified or approved, samples shall be collected in April and October.
Annually	Samples shall be collected at least once per year. Unless otherwise specified or approved, samples shall be collected in October.
mg/L	Milligrams per liter
mL/L	Milliliters [of solids] per liter
µg/L	Micrograms per liter
µmhos/cm	Micromhos per centimeter
mgd	Million gallons per day
MPN/100 mL	Most probable number [of organisms] per 100 milliliters
General Minerals	Analysis for General Minerals shall include at least the following:

Alkalinity	Chloride	Sodium
Bicarbonate	Hardness	Sulfate
Calcium	Magnesium	TDS
Carbonate	Potassium	

General Minerals analyses shall be accompanied by documentation of cation/anion balance.

Table 1. Priority Pollutant Scan

Inorganics[1]	***Organics***	3-Methyl-4-Chlorophenol	Hexachlorobenzene
Antimony	Acrolein	Pentachlorophenol	Hexachlorobutadiene
Arsenic	Acrylonitrile	Phenol	Hexachlorocyclopentadiene
Beryllium	Benzene	2,4,6-Trichlorophenol	Hexachloroethane
Cadmium	Bromoform	Acenaphthene	Indeno(1,2,3-c,d)pyrene
Chromium (III)	Carbon tetrachloride	Acenaphthylene	Isophorone
Chromium (VI)	Chlorobenzene	Anthracene	Naphthalene
Copper	Chlorodibromomethane	Benzidine	Nitrobenzene
Lead	Chloroethane	Benzo(a)Anthracene	N-Nitrosodimethylamine
Mercury	2-Chloroethylvinyl Ether	Benzo(a)pyrene	N-Nitrosodi-n-Propylamine
Nickel	Chloroform	Benzo(b)fluoranthene	N-Nitrosodiphenylamine
Selenium	Dichlorobromomethane	Benzo(g,h,i)perylene	Phenanthrene
Silver	1,1-Dichloroethane	Benzo(k)fluoranthene	Pyrene
Thallium	1,2-Dichloroethane	Bis(2-chloroethoxy) methane	1,2,4-Trichlorobenzene
Zinc	1,1-Dichloroethylene	Bis(2-chloroethyl) ether	
Cyanide	1,2-Dichloropropane	Bis(2-chloroisopropyl) ether	***Pesticides***
Asbestos	1,3-Dichloropropylene	Bis(2-Ethylhexyl)phthalate	Aldrin
	Ethylbenzene	4-Bromophenyl phenyl ether	alpha-BHC
Dioxin Congeners	Methyl Bromide	Butylbenzyl Phthalate	beta-BHC
2,3,7,8-TCDD	Methyl Chloride	2-Chloronaphthalene	gamma-BHC (Lindane)
1,2,3,7,8-PentaCDD	Methylene Chloride	4-Chlorophenyl Phenyl Ether	delta-BHC
1,2,3,4,7,8-HexaCDD	1,1,2,2-Tetrachloroethane	Chrysene	Chlordane
1,2,3,6,7,8-HexaCDD	Tetrachloroethylene (PCE)	Dibenzo(a,h)Anthracene	4,4'-DDT
1,2,3,7,8,9-HexaCDD	Toluene	1,2-Dichlorobenzene	4,4'-DDE
1,2,3,4,6,7,8-HeptaCDD	1,2-Trans-Dichloroethylene	1,3-Dichlorobenzene	4,4'-DDD
OctaCDD	1,1,1-Trichloroethane	1,4-Dichlorobenzene	Dieldrin
2,3,7,8-TetraCDF	1,1,2-Trichloroethane	3,3'-Dichlorobenzidine	alpha-Endosulfan
1,2,3,7,8-PentaCDF	Trichloroethylene (TCE)	Diethyl phthalate	beta-Endosulfan
2,3,4,7,8-PentaCDF	Vinyl chloride	Dimethyl phthalate	Endosulfan Sulfate
1,2,3,4,7,8-HexaCDF	2-Chlorophenol	Di-n-Butyl Phthalate	Endrin
1,2,3,6,7,8-HexaCDF	2,4-Dichlorophenol	2,4-Dinitrotoluene	Endrin Aldehyde
1,2,3,7,8,9-HexaCDF	2,4-Dimethylphenol	2,6-Dinitrotoluene	Heptachlor
2,3,4,6,7,8-HexaCDF	2-Methyl-4,6-Dinitrophenol	Di-n-Octyl Phthalate	Heptachlor epoxide
1,2,3,4,6,7,8-HeptaCDF	2,4-Dinitrophenol	1,2-Diphenylhydrazine	Polychlorinated biphenyls
1,2,3,4,7,8,9-HeptaCDF	2-Nitrophenol	Fluoranthene	Toxaphene
OctaCDF	4-Nitrophenol	Fluorene	

[1] With the exception of wastewater samples, samples placed in an acid-preserved bottle for metals analysis must first be filtered. If filtering in the field is not feasible, samples shall be collected in unpreserved containers and submitted to the laboratory within 24 hours with a request (on the chain of custody form) to immediately filter then preserve the sample.

[2] Samples to be analyzed for volatile compounds and phthalate esters shall be grab samples; the remainder shall be 24-hour composite samples.

Table 2. Reclamation Area Monitoring

Recycled Water Monitoring Data For Year: _____								
Parcel No. _____ of _____ acres								
		Water application				Nitrogen application		
		Water required	Effluent used	Other water used	Total irrigation water	As fertilizer	As effluent*	Total nitrogen applied
Month	Crop	(AF)	(AF)	(AF)	(AF)	(lbs/acre)	(lbs/acre)	(lbs/acre)
October								
November								
December								
Subtotal:								
January								
February								
March								
Subtotal:								
April								
May								
June								
Subtotal:								
July								
August								
September								
Subtotal:								
Annual Total:								
* calculated as (AF effluent/acre) x (2.72) x (X mg/l total nitrogen) = lbs nitrogen/acre								

INFORMATION SHEET

ORDER NO. R5-2009-0122
CITY OF BAKERSFIELD
WASTEWATER TREATMENT PLANT NO 2
KERN COUNTY

The City of Bakersfield's (Discharger) Wastewater Treatment Plant No. 2 (WWTP No. 2) serves the eastern portion of the incorporated Bakersfield metropolitan area (City) generally east of Highway 99 in Kern County. WWTP No. 2 is currently regulated by Waste Discharge Requirements Order No. 97-104 (WDRs) and Cease and Desist Order No. 97-105 (CDO).

Background

WWTP No. 2 opened in 1958 and was upgraded to a secondary treatment plant in 1978 with a design capacity of 19 mgd. The 1978 plant consisted of headworks, two primary clarifiers, four aerated lagoons, two sludge digesters, eighteen sludge drying beds, and eight storage ponds. In September 2000, the Discharger completed an expansion of the WWTF to increase the daily flow capacity of the plant to 25 mgd. The expansion included adding one additional primary clarifier, three trickling filters, three secondary clarifiers, two additional sludge digesters with methane recovery and a cogeneration system, and an upgrade of the effluent pumping system. In 2004, an effluent storage expansion project was completed that converted the four aerated lagoons to one storage pond and expanded the storage capacity of another existing storage pond.

Treated effluent was recycled on 5,146 acres of farm land owned by the Discharger and farmed by Gary Garone Farms under Wastewater Reclamation Requirements Order No. 82-049. On 23 April 1982, the Central Valley Water Board adopted Waste Discharge Requirements (WDRs) Order No. 82-050 permitting a monthly average dry weather discharge of 19 mgd.

The current WDRs authorize the discharge to land of up to 19 mgd of undisinfected secondary-treated effluent to nine storage ponds and to approximately 5,476 acres of nearby farmlands for recycling. In addition to the municipal influent, WWTP No. 2 accepts approximately 1,600,000 to 1,900,000 gallons a month of septage and restaurant grease. The septage/grease is disposed of into the influent line prior to the headworks. WWTP No. 2 is the Discharger's only facility that accepts septage and restaurant grease at this time.

Effluent is recycled to a multi-parcel disposal area located mostly south of WWTP No. 2. The disposal areas are divided into northern (T30S, R28E) and southern (T31S, R28E) disposal areas. The disposal areas in 1997 consisted of 5,476 acres of farmland.

In January 2006, the Discharger submitted a Report of Waste Discharge (RWD) for the reduction of the available acreage to 4,196 acres of farmland and a revised RWD in April 2006. Central Valley Water Board staff concurred with the findings of the revised RWD in an April 2006 letter to the Discharger. The tentative WDRs circulated reflected the reduction in available acreage; however, in its comments to these WDRs, the Discharger now reports the entire 5,476 acres will remain available for wastewater recycling.

Presently, WWTP No. 2 is well within the 25 mgd design flow (14.5 average since 2007), but the WDRs should be updated to reflect the numerous changes to WWTP No. 2 since the

WDRs were prepared in 1997. Effluent concentrations and reporting are not an issue because the effluent typically meets the prescribed effluent limits (discussed in greater detail in the following pages), and monitoring reports are submitted complete and on time.

Solids/Biosolids Disposal
Solids removed by the bar screens and materials collected from the grit chamber are disposed of at a sanitary landfill.

Sludge and scum are pumped to three anaerobic digesters and digested sludge is discharged to 18 unlined sludge drying beds. Decant from the sludge beds is returned to the headworks. Gas produced by the digestion units is used as a fuel for the cogeneration plant. Dried sludge is used as a soil conditioner/amendment and fertilizer for non-human consumption crops grown on designated farmlands owned by the City of Bakersfield. The Discharger submits Annual Biosolids Management Reports.

The Discharger's *Final Biosolids Management Plan* dated 26 September 1997 describes its management plan for biosolids applied to the reclamation area. The Discharger conducts quarterly sampling of the biosolids and monitors the cumulative loading of metals in the biosolids applied pursuant to 40 CFR Part 503.

The Discharger prepares Annual Land Management reports that document the amount and to which field's biosolids were applied. According to data presented in the 2007 Annual land Management report, the Discharger applied 3,832 dry US tons of biosolids generated from both WWTP No. 2 and WWTP No. 3 in 2007. The reclamation area farmland is currently leased to the Progressive Associates Group to farm the acreage until 2015.

Groundwater Conditions
The hydrogeologic conditions beneath WWTP No. 2 and the disposal areas are complex. A 1982 *Groundwater Conditions in the Vicinity of Bakersfield WWTP No. 2* by M. Rector Inc. indicates the former channel of the Kern River is present in the area. The "1887 Kern River Channel" is depicted as being generally west of the disposal areas and WWTP No. 2 and the "Ancient Kern River Channel" is depicted cutting across the northern disposal areas and beneath WWTP No. 2. The former river channels are reported to be associated with some of the perched groundwater conditions in the region.

Furthermore, the Corcoran Clay is present beneath the southern disposal areas, but not beneath WWTP No. 2 or the northern disposal areas. This results in groundwater occurring in two main aquifers (a discontinuous perched zone and an unconfined aquifer) in the vicinity of WWTP No. 2 and the northern disposal areas, and in three main aquifers (a confined aquifer in addition to the perched and unconfined aquifers) beneath the southern disposal areas. The Discharger monitors the perched or shallow water bearing zone and the unconfined aquifer. Available data does not indicate that monitoring of the confined aquifer is necessary.

Groundwater Monitoring Network
According to the *2008 Summary of Groundwater Conditions* prepared by GEOCON Consultants on behalf of the Discharger, the Discharger uses a combination of piezometers,

groundwater monitoring wells, and domestic/irrigation supply wells (also called City Wells) to monitor groundwater quality. The groundwater monitoring network consists of: about 58 piezometers to monitor the shallow groundwater zone of which 40 are owned by the Discharger and 18 are owned by the Kern County Water Agency (KCWA); about 56 domestic/irrigation wells (supply wells) of which 20 are monitored by the Discharger and 36 are monitored by the Kern Delta Water District (KDWD); and 6 groundwater monitoring wells owned by the Kern Sanitation Authority (KSA).

The shallow zone is monitored using about 58 piezometers of which 40 are owned by the Discharger and 18 are owned by the Kern County Water Agency (KCWA). Monitoring of the shallow groundwater zone is conducted on a semiannual basis (KCWA data is collected annually) and includes recording the depth to perched water and measuring EC values if water is present. The depth of the piezometers ranges from about 11 to 30 feet below the ground surface (bgs). In 2008, the Discharger located only 22 of its 40 piezometers, and only five of those contained measurable groundwater. In piezometers sampled in 2008, EC concentrations ranged between about 230 to 2,700 µmhos/cm.

Monitoring of the domestic/irrigation wells is conducted on a semiannual basis, while monitoring of the KSA wells is conducted on a quarterly basis. Only partial construction details are available for 10 of the 20 supply wells monitored by the Discharger. Two of the wells appear to be set in both the confined and unconfined aquifer, and several have well screens greater than 100 feet in length. There is nearly no information available regarding the depth of well seals, filter packs, etc. The lack of construction details brings into question whether the monitoring network provides adequate coverage for the WWTP and if wells are truly set in only the unconfined aquifer.

It appears only the six KSA wells are true groundwater monitoring wells. These wells are reported to range from 150 to 220 feet in depth and have 40-foot screened intervals. None of the KSA wells are upgradient of WWTP No. 2.

Depth to Groundwater

In 2008, the Discharger could locate only 22 of its 40 piezometers, and only five of those contained measurable perched groundwater. In February 2008, 11 of 18 KCWA piezometers contained measurable perched groundwater, with the other seven dry. The depth to water in the piezometers in 2008 ranged from about seven to 28 feet bgs.

The depth to groundwater in the KSA wells in 2007 ranged from about 106 to 162 feet bgs. Based on the KSA wells, the direction of groundwater flow at WWTP No. 2 is somewhat variable due to the mounding caused by the existing storage ponds, but the regional flow direction is to the east/southeast.

The depth to water in 2008 ranged from about 72 to 297 feet bgs in the supply wells. This does not likely represent the true depth to groundwater due to differences in well depths, screened intervals, and filter packs. In the 1982 M. Rector, Inc. report, the depth to groundwater was reported to be less in the southern area and greater in the northern area and resulted in the direction of flow in the southern area being to the north/northeast. Recent

reports, however, show the wells in the southern areas to have greater depths to water which results in a flow direction to the east southeast. In a 2005 *Summary of Groundwater Conditions in the Vicinity of WWTP No. 2* prepared by Ken Schmidt and Associates, Mr. Schmidt states that the gradient as shown to the east/southeast is due to the fact that the KSA wells were installed shallower than the supply wells and the depths to water recorded from them are less (i.e., they have a higher groundwater elevation) than those reported for the supply wells.

Groundwater Quality

Shallow Groundwater Zone

In piezometers sampled in 2008, EC concentrations vary greatly and ranged between about 230 to 2,800 µmhos/cm. However, the 2,800 EC result is from a piezometer that is upgradient of WWTP No. 2 indicating the WWTP is not the likely source of the elevated EC. The piezometer monitoring network appears of little use in measuring the presence of perched groundwater or its quality and monitoring of the piezometer network should be discontinued.

Unconfined Aquifer

Groundwater quality in the KSA and supply wells is highly variable and likely due to various outside influences both past and present. The former Kern River channel appears to correlate to some of the elevated concentrations. Review of oil field records found numerous permits for oil wells in the disposal areas. Review of aerial photographs identified several confined animal facilities located upgradient of the monitoring wells and several ponds of unknown use were observed.

Groundwater quality in the KSA wells is shown in Table 3.

TABLE 3 – KSA WELL WATER QUALITY

Constituents	Units	KSA1	KSA2	KSA3	KSA4	KSA5	KSA6
Electrical Conductivity	µmhos/cm	698	862	994	1030	1370	912
Chloride	mg/L	92	186	195	152	223	142
Nitrate (as N)	mg/L	5.9	1.1	6.5	13	4.6	10.2

Average EC concentrations are highest in wells KSA4 and KSA5. KSA4 is downgradient of the disposal ponds and the City's composting facility, while KSA5 is downgradient of a disposal area in Section 28, T30S, R28E. It seems unlikely that the effluent that has averaged about 742 µmhos/cm since 2007 would cause the observed concentrations. Both wells are in sections that have had historic oil field operations and appear to be within the Ancient Kern River Channel.

Two other wells, KSA2 and KSA3, currently have EC concentrations over 1,000 µmhos/cm, although their historic averages are less than 1,000 µmhos/cm. KSA3 has only increased slightly from about 950 µmhos/cm in 1998 to about 1,030 in 2008, but KSA2 has shown a

significant increase in concentration from about 650 µmhos/cm in 1998 to about 1,100 µmhos/cm in 2008. KSA2 is located in the northern disposal area downgradient of the disposal area in Section 15, T30S, R28E. Oil field activities have occurred in this area in the past and it appears to be within the channel area of the Ancient Kern River. Chloride concentrations are increasing as well, but nitrate is less than 2 mg/L. This suggests reducing conditions in this area. It is unclear what the cause of the increases in this well are from, but the Discharger needs to evaluate the increasing trends in this well.

All chloride concentrations in the KSA wells are below the secondary MCL of 250 mg/L, but all but one are above the lowest agricultural limit for salt sensitive crops of 106 mg/L. There is no true KSA background well, but chloride concentrations in City Well 2 (background supply well) averaged about 31 mg/L up to 2007. With an average chloride concentration of about 75 mg/L since 2007, it seems unlikely that WWTP No. 2 is the cause of the elevated chloride concentrations observed. The elevated concentrations are likely the result of other offsite activities.

Nitrate as nitrogen concentrations are above the Primary MCL of 10 mg/L in wells KSA4 and KSA6. Both wells are downgradient to crossgradient of the City's biosolids disposal area.

EC concentrations in the supply wells were highly variable and ranged from about 400 to 5,000 µmhos/cm in 2008. The highest EC concentrations are recorded in a well designated City Well No. 12 (31S/28E-10C). City Well No. 12 is downgradient of one of the southern disposal areas. It is unclear what aquifer this well draws from, but it would not appear effluent could cause such high concentrations.

Average chloride concentrations in the supply wells ranged from about 17 mg/L to 1,120 mg/L, with the highest concentrations observed in City Well No. 13, which has not been sampled since July 2005 due to the pump being inoperable.

Samples from the supply wells are analyzed for nitrate (as N) and have averaged from less than 1 mg/L to 16 mg/L. Two wells had concentrations greater than 10 mg/l in 2008, City Well Nos. 10 and 16. Both wells are in the southern disposal area and appear to be downgradient of what appear in aerial photographs to be dairies.

The upgradient well, City Well No. 2, is at a closed golf course and the well has been reported inoperable since January 2007; hence, no samples have been collected since then.

The information presented above points out the inadequacy of the existing monitoring well network. Most piezometers have not contained measurable water in years and many have not been located for years. Construction information for many of the supply wells is not available and the well previously used for background water quality monitoring is no longer operable. It appears the depth of the supply wells influences the depth to water in each well and likely results in the direction of groundwater flow being incorrectly represented. The new WDRs should contain a provision requiring the Discharger to evaluate its groundwater monitoring network and propose new wells and/or changes in monitoring to best characterize groundwater conditions.

Compliance History

The Discharger submits monthly, quarterly, and annual self-monitoring reports (SMRs) in compliance with the Monitoring and Reporting Program. The Discharger typically submits complete monitoring reports in a timely manner. There were no late or incomplete reports submitted in 2007, 2008, or to date in 2009.

BOD concentrations in effluent exceeded the monthly average limit of 40 mg/L twice since January 2008 (once in February 2008 at 41 mg/L and once in May 2009 at 43 mg/L). Both occurrences were reported to be the result of upsets to the treatment systems. The discharge is now compliant with the existing and proposed effluent limits.

The calculated limit for EC (500 µmhos/cm plus the EC of the source water) and the flow limit of 19 mgd have not been exceeded since at least January 2007. As shown by the above data, the effluent is typically compliant with the various limits.

The WWTP has been inspected seven times since August 1997 and four NOVs have been issued. A March 1999 inspection resulted in the preparation of an NOV for pond embankment erosion and exceeding the BOD and TSS limits. The Discharger submitted an August 1999 letter indicating the embankment problems were addressed during plant expansion activities and it was addressing the exceedance of the BOD and TSS limits. A 21 August 2000 NOV was prepared for failure to submit an O&M Plan. The Discharger provided the O&M plan on 29 August 2000. An August 2003 NOV was issued in response to an overflow of effluent outside the reclamation area. A 14 January 2008 NOV was issued following a July 2007 inspection that indicated the Discharger was exceeding the limits for BOD and pH as well as weed growth in the ponds. The Discharger submitted a May 2008 letter satisfactorily addressing the weed growth and pond construction details (not mentioned in the NOV). The effluent limit violations were not addressed, but the Discharger has typically been in compliance since 2008.

Cease and Desist Order (CDO) No. 97-105 was issued with a time schedule for the Discharger to become compliant with effluent limits in the WDRs. In order to be compliant with the CDO, the Discharger was required to expand and upgrade WWTP No. 2 by January 2000, submit monthly status reports documenting the progress of the expansion activities, and comply with the effluent limits following the expansion activities. The Discharger completed the expansion of the WWTP in September of 2000 and submitted the monthly status reports as required. Rescission of the CDO is considered in a separate order.

Basin Plan, Beneficial Uses, and Regulatory Considerations

The Basin Plan indicates the greatest long-term problem facing the entire Tulare Lake Basin is increasing salinity in groundwater, a process accelerated by man's activities and particularly affected by intensive irrigated agriculture. The Basin Plan recognizes that degradation is unavoidable until there is a long-term solution to the salt imbalance. The Regional Water Board encourages proactive management of waste streams by dischargers to control addition of salt through use, and has established an incremental EC limitation of 500 µmhos/cm as a measure of the maximum permissible addition of salt constituents through use.

Discharges to areas that may recharge good quality groundwaters shall not exceed an EC of 1,000 µmhos/cm, a chloride content of 175 mg/L, or boron content of 1.0 mg/L.

Antidegradation

The antidegradation directives of State Water Board Resolution No. 68-16, "Statement of Policy With Respect to Maintaining High Quality Waters in California," or "Antidegradation Policy" require that waters of the State that are better in quality than established water quality objectives be maintained "consistent with the maximum benefit to the people of the State." Waters can be of high quality for some constituents or beneficial uses and not others. Policy and procedures for complying with this directive are 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, water recycling, 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 impact 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.

The current WDRs did not specifically address Resolution 68-16, but stated; "the discharge, in combination with other sources, shall not cause underlying groundwater to contain waste constituents in concentrations statistically greater than background water quality except for EC. For EC, the incremental increase over any five-year period shall not exceed 25 µmhos/cm."

Constituents of concern that have the potential to degrade groundwater include, in part, nutrients and salts. However, the discharge will likely not degrade the beneficial uses of groundwater because:

a. For nitrogen, concentrations in the unconfined aquifer typically meet water quality objectives, with two of the 20 City Wells exceeding the MCL of 10 mg/L and two of the six KSA wells. Nitrate as nitrogen concentrations in the former background well (City Well No. 2) averaged about 2.0 mg/L. The Discharger stores its effluent in storage ponds prior to discharge to the farmlands. The ponds contain a compacted soil base to minimize percolation of wastewater to the underlying groundwater. The ponds are periodically allowed to go dry allowing the base layer to dry and the potential for desiccation cracks to form, so some seepage to groundwater could occur. However, the Discharger recycles its effluent on cropped farmlands at agronomic rates making it unlikely that effluent from WWTP No. 2 will degrade groundwater. As stated in the proposed Effluent Limits, the Discharger has an option of meeting the total nitrogen limit of 10 mg/L or providing a performance demonstration that effluent contained in the storage ponds will not contribute to nitrogen in groundwater exceeding the groundwater limitations. Evaluation of nitrogen concentrations in the unconfined aquifer will be a part of the groundwater monitoring evaluation required as a provision in these WDRs.

b. For salinity, the Basin Plan contains effluent limits for EC of SW + 500 µmhos/cm, 1,000 µmhos/cm max that considered antidegradation when adopted. With an EC of about 750 µmhos/cm, the treated effluent meets the Basin Plan limit for SW + 500 µmhos/cm. The WDRs would set an effluent limitation for EC of 500 µmhos/cm over source or a maximum of 1,000 µmhos/cm, whichever is less and a chloride limit of 175 mg/L and should therefore not unreasonably degrade the beneficial uses of groundwater with respect to salinity. Additionally, data as far back as 1952 (prior to the construction of the WWTP) indicates EC concentrations up to 1,300 µmhos/cm in wells downgradient of WWTP No. 2. This shows that elevated EC concentrations downgradient of WWTP No. 2 existed prior to the construction of the plant.

Sodium exceeds the most stringent agricultural limit of 69 mg/l for spray irrigated salt sensitive crops. Background sodium concentrations (based on City Well No. 2) are about 40 mg/L, while sodium concentrations in effluent average about 81 mg/L indicating some degradation could occur. However, review of various reports (USDA, *Soil Survey of Kern County: Northwestern Part*; Ayers and Westcott, *Water Quality for Agriculture;* Asano, *Wastewater Reclamation and Reuse)*, soil types in the disposal areas, and land use maps showing crops grown in the region, indicates salt-sensitive crops are not likely to be grown in the area around the facility.

Ayers and Westcott indicate sodium concentrations up to 70 mg/L have no restrictions for salt-sensitive crops and concentrations from 70 to 210 mg/L have only slight to moderate restrictions. Asano provides numerical guidelines for irrigation of salt-sensitive crops and reports that sodium concentrations less than 100 mg/L have slight to no restrictions for irrigation of salt-sensitive crops.

Based on the information above, a numerical sodium limit is not necessary because sodium concentrations in groundwater will not restrict its use for agricultural or drinking water and accordingly will not unreasonably affect present and anticipated beneficial uses or result in groundwater quality exceeding water quality objectives.

The proposed WDRs do not include specific limits for all of the constituents in the current WDRs since:

a. Most of the constituents have MCLs, which are specified by the Basin Plan and included under Groundwater Limitations, G.1.a of Order R5-2009-0122;

b. Some of the limits were duplicative (e.g., EC and TDS);

c. Groundwater Limitation G.1.b will provide a mechanism to ensure that constituents without an MCL do not threaten to unreasonably degrade groundwater; and

d. To prevent too many false positive violations, the list of regulatory limits should be limited to the best indicators of a groundwater problem that would be caused by the discharge.

However, groundwater will continue to be monitored for all the constituents for which limits are being dropped.

In general, the future discharge will have less impact on water quality than previously permitted discharge. The EC of the discharge will be less than the Secondary MCL of 900

µmhos/cm. Background groundwater is above this limit in places, so the appropriate groundwater limit is 1,600 µmhos/cm. Although greater than the groundwater limit in the previous WDRs, sodium concentrations average about 80 mg/L, which does not restrict usage for the areas agriculture or as a drinking water source. Additionally, the Order contains requirements for a groundwater assessment for assuring that the highest water quality consistent with the maximum benefit to the people of the State will be achieved.

In summary, this Order establishes new groundwater limits for WWTP No. 2 that will not unreasonably threaten present and anticipated beneficial uses or result in groundwater quality that exceeds water quality objectives set forth in the Basin Plan.

Title 27

Title 27, CCR, 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.

Title 27 Section 20090(a) exempts discharges of domestic sewage to land from Title 27 containment standards provided the Regional Water Board has issued waste discharge requirements or waived such issuance; and the discharge is consistent with applicable water quality objectives.

The discharge from WWTP No. 2 is in compliance with the requirements of the Basin Plan. It appears effluent will degrade groundwater, but the degradation is within applicable water quality objectives. Additionally, water quality is variable both downgradient and upgradient of WWTP No. 2, but those concentrations do not appear to be the result of discharge from WWTP No. 2.

CEQA

WWTP No. 2 opened in 1958 and was upgraded to a secondary treatment plant in 1978 with a design capacity of 19 mgd. A 1984 Wastewater Reclamation Permit, Order No. 82-049 was issued by the Central Valley Regional Water Board to the City of Bakersfield in April 1984 for the reclamation of wastewater to approximately 5,000 acres of agricultural lands. Finding 10 of Order No. 82-049 indicated the “project is an existing facility and is categorically exempt from the development of an Environmental Impact Report in accordance with Section 15101, Chapter 3, Title 14 of the California Administrative Code.

In 1990, the Discharger adopted a Negative Declaration for a plant expansion project in September 1990 in accordance with the California Environmental Quality Act. In September 2000, the Discharger completed an expansion of the WWTF to increase the daily flow capacity of the plant to 25 mgd. In 2004, an effluent storage expansion project was completed, that allowed the Discharge to 5,476 acres of nearby farmland. A revised RWD was prepared in April 2006 that provided documentation to decrease the required acreage to

4,196 acres at a flow of 25 mgd. Central valley Water Board staff concurred with the findings of the revised RWD in an April 2006 letter to the Discharger.

Proposed Order Terms and Conditions

Discharge Prohibitions, Effluent Limitations, Discharge Specifications, and Provisions
The proposed Order prohibits discharge to surface waters and water drainage courses.

The proposed Order would set a flow limit of 25 mgd with effluent limits for BOD and TSS of 40 mg/L (monthly average), and 80 mg/L (daily maximum). These limitations are based on Basin Plan minimum performance standards for municipal facilities.

The discharge requirements regarding dissolved oxygen and freeboard are consistent with Regional Water Board policy for the prevention of nuisance conditions, and are applied to all such facilities.

In order to protect public health and safety, the proposed Order requires the Discharger to comply with the provisions of Title 22 and to implement best management practices with respect to recycled water application (application at reasonable rates considering the crop, soil, and climate).

The proposed WDRs 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 includes Provisions to prepare a salinity control plan to control the salinity of its discharge and submit a nutrient management plan to evaluate its recycling practices to comply with the groundwater limitations in this Order and ensure that beneficial uses of groundwater will be maintained. The technical report shall include a time schedule to implement the identified measures.

Monitoring Requirements
Section 13267 of the CWC authorizes the Regional 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. Section 13268 of the CWC authorizes assessment of civil administrative liability where appropriate.

The proposed Order includes influent, effluent, unconfined groundwater, pond, and water supply 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.

JSP/DKP 12/10/2009