CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN DIEGO REGION

INFORMATION SHEET

TENTATIVE ORDER NO. R9-2009-0147

WASTE DISCHARGE REQUIREMENTS
FOR RITE TIME PHARMACEUTICALS INC.
ANZA COMMERCIAL CENTER ONSITE WASTEWATER TREATMENT SYSTEM

BACKGROUND

Mr. Soji Akanwo of Rite Time Pharmaceuticals Inc. (Discharger) submitted a Report of Waste Discharge (ROWD) for the treatment and disposal of domestic wastewater from a proposed Onsite Wastewater Treatment System (OWTS) that will serve a commercial center development. The development will be located on the southwest corner of Highway 371 (Cahuilla Road) and Maze Stone Road in Anza, Riverside County. The proposed OWTS will serve a pharmacy, a medical clinic, a restaurant, and six retail stores all located at the Anza Commercial Center. The proposed OWTS consists of a grease interceptor, a primary equalization tank, a recirculation/blending tank, Advantex AX 100 trickling biofilter units, and a post anoxic dosing tank. The primary disposal system will be a subsurface drip irrigation system, while seepage pits will serve as an emergency back-up to the drip irrigation system.

Tentative Order No. R9-2009-0147 prescribes waste discharge requirements that apply specifically to the discharge of treated domestic wastewater from the proposed OWTS. Tentative Order No. R9-2009-0147 requires that the Discharger meet applicable water quality standards, as well as ensures proper and effective operation of the onsite wastewater treatment and disposal systems. This Information Sheet provides additional background information and technical details regarding the development of the requirements of Tentative Order No. R9-2009-0147.

BASIS FOR DISCHARGE SPECIFICATIONS

Tentative Order No. R9-2009-0147 establishes both technology based and water quality based discharge specifications. The technology based discharge specifications for Biological Oxygen Demand (BOD) and Total Suspended Solids (TSS) contained in Tentative Order No. R9-2009-0147 are based on minimum standards for removal of these constituents by secondary wastewater treatment technology (specified in Title 40 Code of Federal Regulations, section 133.102), and on the discharge specifications for BOD and TSS for OWTS with supplemental treatment components specified in the proposed State Water Resources Control Board (State Board) OWTS regulations.[1]

Tentative Order No. R9-2009-0147 also contains water quality based discharge specifications which are derived from the water quality objectives for the Caverocks Hydrologic Area (HA) in Table 3-3 of the *Water Quality Control Plan for the San Diego Basin* (Basin Plan).

[1] The proposed State Board OWTS regulations can be found on the following webpage: www.swrcb.ca.gov/water_issues/programs/septic_tanks/docs/appendix_b_proposed_owts_regulations.pdf

Twelve-month average discharge specifications for all of the constituents listed in Table 6 of Tentative Order No. R9-2009-0147, with the exception of total nitrogen and TDS were set at the water quality objectives. As a result a discharge in compliance with these discharge specifications will be in compliance with the water quality objectives for the Caverocks HA.

ANTIDEGRADATION ANALYSIS

State Water Board Resolution No. 68-16 (also known as the State Antidegradation Policy) requires that high quality of waters of the State are maintained to the maximum extent possible, even when the quality is better than needed to protect beneficial uses, and that changes in water quality are only allowed if the change is consistent with maximum benefit to the people of the State, does not unreasonably affect present and anticipated beneficial uses, and does not result in water quality less than that prescribed in water quality control plans or policies. The discharge is consistent with the State Antidegradation Policy based on the following criteria:

Compliance with Water Quality Objectives and Impact on Beneficial Uses

Impacts of the discharge on groundwater quality were mainly assessed based on expected concentrations of TDS and nitrogen in the discharge. This is because TDS serves as an indicator parameter for the presence of mineral constituents in wastewater, and because the concentration of nitrogen in the discharge from the OWTS is expected to exceed the water quality objective for nitrate-nitrogen. The effluent discharge specification for TDS was set at 650 milligrams per Liter (mg/L) based on the expected concentration of TDS in the discharge from the OWTS. The Discharger estimates that the concentration of TDS in the discharge will be an increment of about 250 mg/L above the water supply TDS concentration. Based on mass balance calculations (see attachment), a discharge of effluent containing TDS at 650 mg/L could cause the concentration of TDS in the groundwater to increase above background levels, but is not expected to cause the groundwater to exceed the water quality objective for TDS.

The discharge specification for total nitrogen was set at 12 mg/L as Nitrogen (N) because the Report of Waste Discharge (ROWD) submitted by the Discharger estimates that the concentration of total nitrogen in effluent discharged from the OWTS will be about 12 mg/L as N. The ROWD also estimates that the concentration of nitrogen in leachate reaching the groundwater after disposal via subsurface drip irrigation will be between 3.8-6.0 mg/L as N due to assimilation by rainfall recharge within the site, nutrient uptake by vegetation being irrigated with the effluent, and denitrification in the soil. The ROWD, however, concluded that the discharge could cause the concentration of nitrogen in the groundwater to increase above background levels, but the discharge is not expected to cause the groundwater to exceed the water quality objective for nitrate-nitrogen.

The nearest domestic well directly downgradient of the site is less than half a mile away. Although the discharge from the OWTS may result in degradation of water quality, the discharge is not expected to adversely affect beneficial uses because it will not cause groundwater to exceed drinking water standards or water quality objectives.

Consistency with Maximum Benefit to People of the State

The discharge from the proposed commercial center will be in the maximum benefit of the people of the State because the commercial center will include a pharmacy and a medical clinic which will provide essential services to the community, and restaurants which provide commercial services to the Anza area. In addition, the project has been approved by the County of Riverside Planning Department (County), and is consistent with County's land use requirements.

Best Practical Treatment

The ROWD outlined different wastewater treatment alternatives to minimize groundwater degradation caused by nitrogen loading from the discharge, and included a cost analysis of each treatment alternative proposed. In order to minimize degradation of water quality, the Discharger will utilize an advanced treatment system and a subsurface drip irrigation system for treatment and disposal of wastewater which will significantly reduce the nitrogen concentration in the discharge. Based on the cost analysis provided in the ROWD, other treatment alternatives that will further reduce the nitrogen concentration in the discharge are cost prohibitive. As a result the use of an advanced treatment system and a subsurface drip irrigation system will result in the best practical treatment of wastewater.

BASIS FOR OWTS DESIGN AND OPERATION SPECIFICATIONS

Tentative Order No. R9-2009-0147 includes design and operation specifications to ensure proper operation, monitoring, and maintenance of the onsite treatment and disposal systems. Effluent discharged from the OWTS will be disposed via a subsurface drip irrigation system. Proper operation of the drip irrigation system is essential because further removal of organic chemicals, nutrients, and bacteria occurs as wastewater percolates into the soil in the disposal areas, and poorly operated and designed drip irrigation systems can result in discharge of pollutants of groundwater. Proper operation of the onsite treatment and disposal systems is also required to protect public health. The OWTS design and operation specifications contained in Order No. R9-2009-0147 requires the Discharger to submit a design plan prior to installation of the onsite treatment and disposal system, which includes measures to ensure proper operation and adequate maintenance of the system. These measures are based on the State of Florida Department of Health (Florida DOH) standards for operation of onsite treatment and disposal systems. The Florida DOH standards were incorporated into Tentative Order No. R9-2009-0147 because the State of California has not yet adopted regulations for the operation and maintenance of onsite treatment and disposal systems.

Tentative Order No. R9-2009-0147 requires the Discharger to maintain an onsite operation and maintenance manual and maintain a service contract with a service provider to ensure adequate operation and monitoring of the OWTS. The Discharger is also required to submit a certification report signed by a professional civil engineer which certifies that the installed onsite treatment and disposal systems complies with the design plan. The certification report also serves as an acknowledgment by the Discharger that the onsite treatment and disposal systems have been designed and installed to meet the requirements of Tentative Order No. R9-2009-0147.

BASIS FOR THE MONITORING AND REPORTING REQUIREMENTS

Monitoring and Reporting Program No. R9-2009-0147 establishes effluent monitoring and reporting requirements pursuant to section 13267 of the California Water Code to verify compliance of the discharge with the discharge specifications. Monitoring and Reporting Program No. R9-2009-0147 also requires monitoring of groundwater in the vicinity of the disposal area to verify the impact of the discharge on groundwater quality, and verify compliance with the State Antidegradation Policy and Basin Plan water quality objectives. The cost to implement the Monitoring and Reporting Program is reasonable in relationship to the need for the reports and the benefits to be obtained from the reports.

LIST OF REFERENCE DOCUMENTS

The following documents provide the necessary references for the bases of Tentative Order No R9-2009-0147:

1. EPA Process Design Manual for Land Treatment of Municipal Wastewater, October 1981
2. Porter Cologne Water Quality Control Act, January 1, 2006
3. State Water Resources Control Board Proposed Onsite Wastewater Treatment Systems Regulations (www.swrcb.ca.gov/water_issues/programs/septic_tanks/docs/appendix_b_proposed_owts_regulations.pdf)
4. Technical Memorandum titled *Wastewater Treatment and Disposal, Anza Commercial Center Project*, September 12, 2008
5. Technical Report titled *Report of Waste Discharge for Anza Commercial Center*, November 9, 2008.
6. Title 40 Code of Federal Regulations, section 133.102
7. *Water Quality Control Plan for the San Diego Basin*, September 8, 1994

ATTACHMENT TO INFORMATION SHEET

NITROGEN AND SALT BALANCE CALCULATIONS

Nitrogen Balance Calculations

The concentration of nitrogen in effluent (C_p)can be calculated using the Nitrogen Loading Equation from the EPA Process Design Manual for Land Treatment of Municipal Wastewater (EPA Manual 1981)

$L_w = [C_p (P - E_t) + U^*(10)]/ [(1-f) C_N - C_p)$

L_w, wastewater loading rate/design flow = 7,000 gallons per day (gpd) or 391 centimeters per year (cm/yr) (from ROWD)
P, annual precipitation = 52.3 cm/yr (from ROWD)
E_t, annual evapotranspiration = 132.6 cm/yr (from ROWD)
U, plant uptake of nitrogen = 235 kilograms per hectare per year (kg/ha/yr) (from EPA Manual 1981)
f, fraction of nitrogen lost to denitrification = 0.1 (from EPA Manual 1981)
C_N, concentration of nitrogen in wastewater applied via irrigation = 12 milligrams per liter as Nitrogen (mg/L as N) (from ROWD)
C_p, concentration of nitrogen in wastewater percolating to groundwater

Calculated C_p using above parameters = 6 mg/L

Concentration of nitrogen in groundwater can be calculated using a simple mass balance equation

Q_{ww}, design flow of OWTS = 7,000 gpd (from ROWD)
C_N, concentration of nitrogen in wastewater applied via irrigation = 12 mg/L (from ROWD)
Q_{Gw}, groundwater flow rate beneath site = 84,000 gpd (from ROWD)
C_{Gw}, background concentration of nitrogen in groundwater = 0 mg/L (from ROWD)

C_{final}, conc. of nitrogen in groundwater after wastewater discharge = $\frac{(Q_{ww} * C_p) + (Q_{Gw} * C_{Gw})}{Q_{Gw}}$

C_{final} = $\frac{(7{,}000 \text{ gpd} * 12 \text{ mg/L}) + (84{,}000 \text{ gpd} * 0 \text{ mg/L})}{84{,}000 \text{ gpd}}$ = 0.5 mg/L (below wqo of 2.2 mg/L)

Using above mass balance equation, a minimum groundwater flow rate of ***19,100 gpd*** is required so the discharge from the OWTS will not cause the groundwater to exceed the nitrate water quality objective (wqo) of 2.2 mg/L as N.

Salt Balance Calculations

Concentration of Total Dissolved Solids (TDS) in groundwater can be calculated using a simple mass balance equation

Q_{ww}, design flow of OWTS = 7,000 gpd (from ROWD)
C_N, maximum expected concentration of TDS in wastewater applied via irrigation = 650 mg/L (from Discharger)
Q_{Gw}, groundwater flow rate beneath site = 84,000 gpd (from ROWD)
C_{Gw}, background concentration of TDS in groundwater = 400 mg/L (from ROWD)

C_{final}, conc. of TDS in groundwater after wastewater discharge = $\frac{(Q_{ww} * C_p) + (Q_{Gw} * C_{Gw})}{Q_{Gw}}$

$$C_{final} = \frac{(7{,}000 \text{ gpd} * 650 \text{ mg/L}) + (84{,}000 \text{ gpd} * 400 \text{ mg/L})}{84{,}000 \text{ gpd}} = 454 \text{ mg/L (below wqo of 500 mg/L)}$$

Using above mass balance equation, a minimum groundwater flow rate of ***45,500 gpd*** is required so the discharge from the OWTS will not cause the groundwater to exceed the TDS wqo of 500 mg/L.

Conclusion: The discharge would cause the concentration of nitrate in the groundwater to increase from 0 mg/L as N to 0.5 mg/L as N, and would also cause the concentration of TDS in the groundwater to increase from 400 mg/L to 454 mg/L. This will result in a degradation of groundwater quality, but will not cause an exceedance of water quality objectives.