

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER NO. R5-2008-0158
WASTE DISCHARGE REQUIREMENTS
FOR
SYNGENTA SEEDS, INC.
WOODLAND SEED PROCESSING FACILITY
YOLO COUNTY

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

1. Syngenta Seeds, Inc. (hereafter known as Discharger) submitted a Report of Waste Discharge (RWD) dated 2 November 2004 to obtain Waste Discharge Requirements (WDRs) for the discharge of seed processing wastewater at its facility at 21435 County Road 98 in Woodland. RWD addenda were submitted on 30 September 2005 and 2 October 2006; and annual self-monitoring reports were voluntarily submitted on 15 December 2005, 15 December 2006, and 17 December 2007.
2. The Syngenta Seeds, Inc. facility is in Section 18, T9N, R2E MDB&M as shown on Attachment A, which is attached hereto and made part of the Order by reference. The processing plant and surrounding cropland, which are owned by the Discharger, are on Assessor's Parcel Number 041-030-14.

Existing Facility and Operations

3. In April 2004, the Yolo County Environmental Health Department discovered that Syngenta Seeds, Inc. was discharging process wastewater to a drainage ditch that flows to Willow Slough, and referred the Discharger to the Regional Water Board to obtain WDRs. The facility has been in operation since 1972, but information about historical ownership and waste management practices is not available. The current owner (the Discharger) had been discharging process wastewater to leachfields and an adjacent drainage ditch that drains to Willow Slough for an unknown time. The Discharger ceased the discharge to surface waters on request and began land-applying wastewater in accordance with an interim operations plan submitted in June 2004 pending adoption of WDRs. There have been no complaints about the Discharger's operations since the original referral by Yolo County.
4. The Discharger has made several operational improvements related to the land discharge of wastewater since the RWD was originally submitted. Specifically, outdoor processing was consolidated into a single area, a finer wastewater screen was installed, the wastewater land application area was expanded, a sprinkler irrigation system was installed, and perennial grass was planted in the wastewater land application area. These changes have reduced waste constituent loadings.
5. The Discharger grows a variety of seed crops (peppers, tomatoes, watermelons, cantaloupe, and squash) on approximately 130 acres of a 160-acre parcel 1.5 miles south of Woodland. Some crops are also grown in greenhouses. The amount of fruit processed

each year has varied from 88 to 173 tons for the last three years. The total annual discharge to the wastewater land application area ranged from 197,000 to 400,000 gallons per year for the last four years.

6. Both field-grown and greenhouse crops are drip irrigated. Beginning in July and continuing intermittently through October, the crops are harvested and processed to remove their seeds. The fruits are mechanically crushed. Coarse solids, such as fruit rinds, are removed and stored temporarily in a bin. The seeds are removed, and the remainder of the fruit (small pieces of rind, skin, pulp, and juice) is flushed into the process wastewater drain by a flume. Antimicrobial solutions are added to the wet seeds before they are placed in rotating drum dryers. Once dry, the seeds are transferred indoors, where they may be further treated with antifungal agents prior to packaging. The seeds produced at the Discharger's facility are ultimately used at other farms to create hybrid strains, which are also harvested for seed that is sold to farmers for crop production.
7. Seed processing takes place outdoors on approximately 4,000 square feet of concrete slabs that drain to a 1,000-gallon septic tank. Another 1,600-square foot slab is used for washing and sterilization greenhouse seedling trays. It also drains to the 1,000-gallon septic tank. Attachments B and C, which are attached hereto and made part of the Order by reference, depict the facility and drainage features.
8. Float switches in the 1,000-gallon septic tank control a submersible pump that conveys the process wastewater to 0.020-inch screen, which discharges to a 3,000-gallon septic tank. Screened wastewater is pumped to the wastewater land application area. The pump in the larger septic tank is also controlled by float switches. Standby trash pumps are available if any of the septic tank pumps fail. Screened solids are collected in a bin for land application with the other residual solids.
9. Several greenhouses are used to grow seedlings and mature plants whose seeds are used for research (Attachment C). All of the greenhouses have evaporative cooling systems that are used to prevent the temperature from rising above about 90 degrees Fahrenheit. Most of the greenhouse cooling systems are closed loop systems with no waste discharge. However, six 2,800-square foot greenhouses generate small volumes of saline wastewater that is drained from the system to reduce salt accumulation on the cooling pads. Sulfuric acid is added to the cooling system supply reservoirs to control mineral scaling. The greenhouse cooling system wastewater is conveyed by aboveground tubing and pipes to a 2,000-gallon trailer-mounted tank, which is periodically dumped into the 3,000-gallon septic tank.
10. The RWD estimates that no more than 500 gallons of wastewater are generated each year by the greenhouse cooling systems, but observations made during a 7 March 2008 facility inspection indicate that this waste stream may be up to several hundred gallons per day (gpd) during warm weather. Based on data for two grab samples tested in 2004, the character of the greenhouse wastewater is summarized below.

<u>Constituent/Parameter</u>	<u>Units</u>	<u>Range of Results</u>
Biochemical oxygen demand	mg/L	<0.2
Total dissolved solids	mg/L	2,044 to 2,314
Fixed dissolved solids	mg/L	1,912 to 1,956
Ammonia nitrogen	mg/L	<0.1
Total Kjeldahl nitrogen	mg/L	3.2 to 4.5
Nitrate + nitrite nitrogen	mg/L	34 to 34.3
Total nitrogen	mg/L	37.2 to 38.8
Calcium	mg/L	35 to 55
Chloride	mg/L	185 to 215
Magnesium	mg/L	201 to 277
Sodium	mg/L	297 to 304

These results indicate high salinity due to evapoconcentration of the supply water. Based on analytical results for the facility’s water supply, which are discussed below, the nitrogen content of this waste stream is also likely due to evapoconcentration of nitrate present in the water supply.

11. The combined process and greenhouse wastewater is pumped from the 3,000-gallon septic tank to a 1.6-acre wastewater land application area, where it is applied by rainbird-type sprinklers to seven irrigation checks. Flow to each check is controlled by manual valves. The checks were recently planted with perennial rye grass, which requires more water than the typical wastewater flow, particularly in the spring, when little or no wastewater is available. The Discharger adds supplemental fresh water as needed to sustain the grass, which is periodically mowed. Under current operations, the cuttings are not removed. However, it is appropriate for this Order to require regular harvesting and removal to prevent nitrogen and salinity build-up in the soil.
12. After the processing season ends in late October, the concrete slabs, sumps, and pipelines are flushed with clean water. This rinse water is discharged to the land application area. A valve in the pipeline between the 1,000- and 3,000-gallon septic tanks is closed, allowing subsequent storm water runoff from the outdoor processing areas to drain to a surface water drainage ditch along the southern property boundary.
13. Various chemicals are used to treat the seeds to control microbial diseases and sterilize seedling trays used in the greenhouses. Estimated usage rates are summarized below.

<u>Chemical</u>	<u>Concentration (percent)</u>	<u>Annual Usage (gallons per year)</u>
Pectinase ¹	NA	50
Tsunami ® ²	NA	4 to 8

Chemical	Concentration (percent)	Annual Usage (gallons per year)
Physan 20™ ³	NA	4
Trisodium phosphate (TSP)	10	50
Chlorine	10	30
Sodium hypochlorite	1	40
Sodium hypochlorite	5	200
Sodium hypochlorite	12.5	50
Hydrochloric acid	1	40
Hydrochloric acid	3	100
Muriatic acid	31	80 to 120

¹ An enzyme that hastens the breakdown of plant cell walls.

² An antimicrobial agent used on seeds that contains 31% acetic acid, 11% hydrogen peroxide, and 15% peroxyacetic acid.

³ A quaternary ammonium compound mixture used as a microbiocide on seeds and for seedling tray sterilization.

NA Not applicable.

14. Based on analytical data submitted with the RWD and annual monitoring reports for 2005, 2006, and 2007, the character of the combined process and greenhouse wastewater is summarized below.

Constituent/Parameter	Units	Mean Analytical Result			
		2004 ¹	2005 ¹	2006	2007
Biochemical oxygen demand	mg/L	844	574	836	1,322
Electrical conductivity	umhos/cm	--	1,611	1,264	1,264
Total dissolved solids	mg/L	1,820	2,813	2,550	2,089
Fixed dissolved solids	mg/L	1,108	987	943	797
Ammonia nitrogen	mg/L	17	25	27	46
Total Kjeldahl nitrogen	mg/L	62	75	130	169
Nitrate + nitrite nitrogen	mg/L	5	18	9	<0.2
Total nitrogen	mg/L	67	93	139	169
Calcium	mg/L	56	44	47	47
Chloride	mg/L	179	203	204	122
Magnesium	mg/L	58	58	75	75
Sodium	mg/L	99	89	89	89

¹ Excludes greenhouse wastewater, which was formerly used for on-site dust control.

-- Not analyzed.

These data indicate that the wastewater is typically high in degradable organics, nitrogen, and salinity.

15. The Discharger proposes a flow limit of 493,000 gallons per year for the combined process and greenhouse wastewater, which is equivalent to 11 inches of water applied to the 1.6-acre land application area each year.
16. Based on a wastewater flow rate of 493,000 gallons per year averaged over 49 days of operation, an average BOD concentration of 944 mg/L, and a typical 8-day application cycle, the cycle average BOD loading would be approximately 50 pounds per acre per day, and the peak (or instantaneous maximum) BOD loading would be approximately 396 pounds per acre per day. However, due to highly variable daily flows and BOD concentrations, actual BOD loadings in 2007 were as high as 70 pounds per acre per day as a cycle average, and 1,100 pounds per acre per day as a peak daily rate. Because the wastewater is screened, there is minimal potential for accumulation of solids on the ground surface. Additionally, sprinkler application aerates the wastewater as it is being applied, and the typical water application rates have been low enough to prevent ponding on the ground surface. Therefore, a high peak daily loading rate may not necessarily cause nuisance conditions, particularly if it occurs infrequently. The Discharger may be able to reduce the peak daily loading rate by correlating historical BOD concentrations for the type of fruit processed to determine when lower application volumes and shorter cycles are needed to reduce the peak BOD loading.
17. At the proposed flow limit, a total of 11 inches of wastewater with an average total nitrogen concentration of 110 mg/L will be applied each year, resulting in a total nitrogen load of 280 pounds per acre per year. The nitrogen actually available to the crop (plant available nitrogen or PAN) will be less than the total nitrogen applied because of ammonia volatilization and denitrification within the root zone. Based on the historical ammonia and organic nitrogen content of the wastewater and the use of sprinklers, PAN may be as low as 83 percent of the total nitrogen or approximately 224 pounds per acre per year. Typical nitrogen requirements for turf grasses are 225 to 260 pounds per acre per year. However, crop nitrogen removal can only be realized if the crops are harvested and removed from the site.
18. The Discharger has designated a land application expansion area (Attachment B). The Discharger will review the previous year's monitoring data prior to the start of each processing season. If needed to comply with the loading rate limitations of this Order, the Discharger will add new irrigation areas and sprinklers systems before the next processing season begins. If wastewater concentrations are similar to previous years, full expansion up to 3.0 acres of land application area should reduce the BOD loading rate to 26 pounds per acre per day as a cycle average, and 634 pounds per acre per day as a peak daily rate. The water loading rate would be about 6 inches per year, and the nitrogen loading rate would be similarly reduced.
19. Fruit rinds, skins, and solids removed in the processing area, and by the wastewater screen, are collected in bins at each location. Based on recent annual processing totals,

if 95 percent of the harvested fruit mass is land applied in solid form, approximately 190 tons of solids are applied to the Discharger's cropland each year. A manure spreader is used to apply the solids to the fields, and they are disked within several days to incorporate the waste. The RWD did not provide characterization data for this waste, but it is expected to contain high concentrations of readily degradable organic matter and nitrogen. There is currently no specific land application area or rotation schedule for this discharge, and the RWD did not provide any information regarding typical solids loading rates. Because of the potential for nuisance conditions associated with readily degradable organic matter on the ground surface and groundwater degradation associated with the nitrogen content of this waste, it is appropriate to require that the Discharger submit a *Solids Management Plan* for review and approval.

20. Domestic wastewater generated at the facility is discharged to a septic system permitted by the Yolo County Environmental Health Department. Three small reverse osmosis systems are used to treat water supplied to the office and laboratory. A small boiler supplies 330 pounds per hour of steam to a small autoclave, which is used to sterilize growing medium. The autoclave is not in continuous use, and the boiler is operated only when the autoclave is in use. The reverse osmosis brine and boiler blowdown are discharged to the septic system. The laboratory is used for visual and microscopic examination of plant tissues and culturing of potential plant pathogens. No chemical analyses are performed.

Site-Specific Conditions

21. The facility and Discharger's cropland are relatively flat at an approximate elevation of 63 feet above mean sea Level (MSL).
22. Storm water runoff from the entire site drains to north-south trending ditches that discharge to a main drainage ditch along the southern boundary of the site. This ditch also receives storm water runoff and tailwater runoff from nearby farms. A sloped roadway along the north side of the main drainage ditch prevents runoff from entering the ditch by overland flow. Based on the topography of the land application site and the method of land application, there should be no irrigation tailwater if the checks are well managed. However, storm water runoff from the wastewater land application area would drain to the ditch. There is some potential for discharge of contaminated storm water runoff from the land application area because the wet season may begin in October and the processing season can extend through the end of that month. However, since the Discharger cannot discharge immediately before, during, or immediately after storm events, the potential for discharge of significantly contaminated storm water would be minimal.
23. Because the Discharger uses sprinkler irrigation on the wastewater land application area and drip irrigation in the fields and greenhouses, there is essentially no tailwater discharge from the site.
24. The processing facility and land application areas are outside of the 100-year flood plain.

25. Subsurface soils at the site are primarily Capay silty clay with small areas of Sycamore silty clay loam and Marvin silty clay loam. The Sycamore silty clay loam, which is found at the processing and wastewater land application areas, is described by the Natural Resource Conservation Service as poorly drained with low permeability.
26. Soil sampling was performed at wastewater land application site in September 2006. The results of that sampling are summarized below.

Sample ID and depth	Analytical Results					
	Soil Solids				Saturated Paste	
	Total Alkalinity ¹	CEC ²	N ³	TDS ⁴	EC ⁵	pH
SB 1						
(0.5-2 ft)	5,175	30.6	1,496	1,320	1,127	7.83
(2.5- 4.0 ft)	6,350	33.9	2,280	1,800	979	7.92
SB 2						
(0.5-2 ft)	5,200	33.4	1,467	624	657	8.37
(5.5-7.0 ft)	9,550	35.4	2,037	1,500	779	8.44
SB 3						
(0.5-2 ft)	5,475	35.5	1,452	930	634	8.47
(5.5-7.0 ft)	6,925	33.0	1,603	1,584	726	8.40

- ¹ mg/Kg as CaCO₃.
² Cation exchange capacity, meq/100 gm.
³ Total nitrogen, mg/Kg.
⁴ Total dissolved solids, mg/Kg.
⁵ Electrical conductivity, umhos/cm.

These data indicate that the soil is slightly alkaline and has good pH buffering capacity. The cation exchange capacity and pH are typical of silty clay soils.

27. The average annual precipitation in the Woodland area is 17.28 inches and the 100-year total annual precipitation is 31.42 inches.
28. The reference evapotranspiration rate (ET₀) for the area is approximately 52 inches per year, and approximately 26 inches of the ET₀ typically occurs from July through October when the discharge occurs.
29. The crop coefficient for turf grasses is approximately 0.8, resulting in an irrigation demand of approximately 24 inches per year in an average rainfall year.
30. Surrounding land uses are agricultural, and no residences are nearby.

31. Process water is supplied from an on-site well that is screened between 320 and 360 feet below the ground surface. Analytical results for five samples obtained between April 2004 and August 2007 are summarized below.

Constituent/Parameter	Units	Analytical Results	
		Range	Mean
Biochemical oxygen demand	mg/L	1 to 17.4	5
Total dissolved solids	mg/L	453 to 646	528
Fixed dissolved solids	mg/L	385 to 480	441
Electrical conductivity	umhos/cm	850 to 1,072	988
Hardness (as CaCO ₃)	mg/L	84 to 311	225
Ammonia nitrogen	mg/L	<0.05 to 0.44	0.27
Total Kjeldahl nitrogen	mg/L	<0.5 to 1.2	0.8
Nitrate nitrogen	mg/L	2.6 to 11.2	7.5
Total nitrogen	mg/L	6.6 to 12.4	9.2
Boron	mg/L	0.2 to 2.3	1.4
Calcium	mg/L	23 to 41	34
Chloride	mg/L	47 to 86	58
Magnesium	mg/L	43 to 57	51
Sodium	mg/L	69 to 132	89

These data indicate that the process water supply is hard, moderately saline, and occasionally exceeds the primary maximum contaminant level (MCL) for nitrate.

Groundwater Considerations

32. Based on groundwater elevation contour mapping developed by the Department of Water Resources for Spring 1997, shallow groundwater may be found at approximately 40 feet MSL (about 25 feet below the ground surface).
33. There are no shallow groundwater monitoring wells at the site, but the Discharger completed a limited assessment of groundwater quality beneath the wastewater land application area in September 2006. Groundwater analytical data obtained from three temporary well points are summarized below. The groundwater sampling locations are depicted on Attachment B.

Constituent/Parameter	Units	Analytical Result			Lowest Water Quality Goal ¹
		SB 1	SB 2	SB 3	
Total dissolved solids	mg/L	693	1055	1391	450 ²
Fixed dissolved solids	mg/L	535	875	1164	NA
Ammonia nitrogen	mg/L	<0.1	<0.1	<0.1	1.5
Total Kjeldahl nitrogen	mg/L	<1	<1	4.45	NA
Nitrate nitrogen	mg/L	43.6	52.1	57.7	10
Total nitrogen	mg/L	43.6	52.1	62.2	NA
Bicarbonate alkalinity	mg/L	400	492	597	NA
Calcium	mg/L	29.0	35.6	34.3	NA
Chloride	mg/L	32.5	77.5	65.0	106 ²
Magnesium	mg/L	63.2	79.3	70.7	NA
Sodium	mg/L	180	305	324	69
Sulfate	mg/L	145	294	205	250 ²
Manganese	mg/L	<0.01	<0.01	<0.01	0.05
Iron	mg/L	<0.10	0.21	0.19	0.30

¹ Refers to the most stringent of the potentially applicable water quality goals for protection of the beneficial uses of groundwater. Actual receiving water (groundwater) limits may be higher or lower depending on site-specific conditions and compliance with applicable Basin Plan policies.

² These parameters are indicative of the salinity of the discharge. Their presence in water can be growth limiting to certain agricultural crops and can affect the taste of water for human consumption. EC is a general indicator of the other salinity constituents. The secondary MCL for EC is 900 umhos/cm as a recommended level, 1600 umhos/cm as an upper level, and 2200 umhos/cm as a short-term maximum. Water Quality for Agriculture, Food and Agriculture Organization of the United Nations—Irrigation and Drainage Paper No. 29, Rev. 1 (R.S. Ayers and D.W. Westcot, Rome, 1985) indicates that irrigation with water with an EC of 700 umhos/cm is protective of salt sensitive crops. Most other crops can tolerate higher EC concentrations without harm. However, as the salinity of the irrigation water increases beyond 700 umhos/cm, more crops are potentially harmed by the EC, or extra measures must be taken by the farmer to minimize or eliminate any harmful impacts.

These data indicate that groundwater beneath the site exceeds water quality objectives for electrical conductivity, dissolved solids, nitrate nitrogen, and sodium. The limited groundwater data do not conclusively demonstrate the source of the apparently poor shallow groundwater quality at the site. It may be naturally occurring, the result of agricultural practices, the result of the previous discharges, or some combination of the three. The land discharge at the current land application site has been ongoing for only four years at relatively low water application rates. Based on the limited volume of the discharge, the seasonal nature of the discharge, the character of the waste, and site-specific soil and groundwater conditions, the discharge has minimal potential to degrade groundwater quality if properly managed. Therefore, groundwater monitoring is not necessary unless the discharge changes significantly or new information regarding the

threat to groundwater quality becomes available. However, it is appropriate to require that the Discharger not allow the salinity of the wastewater to increase, and to require that the Discharger develop and implement a salinity minimization plan.

Other Considerations for Food Processing Waste

34. Excessive application of food processing wastewater to land application areas can create objectionable odors, soil conditions that are harmful to crops, and degradation of underlying groundwater by overloading the shallow soil profile and causing waste constituents (organic carbon, nitrate, other salts, and metals) to percolate below the root zone. Ordinarily, it is reasonable to expect some attenuation of various waste constituents that percolate below the root zone within the vadose (unsaturated) zone. Specifically, some excess nitrogen can be mineralized and denitrified by soil microorganisms, organic constituents (measured as both BOD and volatile dissolved solids) can be oxidized, and some salinity species will undergo cation exchange with clay molecules, effectively immobilizing them.
35. According to *Pollution Abatement in the Fruit and Vegetable Industry*, published by the United States Environmental Protection Agency (US EPA Publication No. 625/3-77-0007) (hereafter *Pollution Abatement*), in applying food-processing wastewater to land for biological treatment, the loading of BOD₅ should not exceed 100 lbs/acre/day (as a cycle average) to prevent nuisance odors. Limiting the cycle average BOD loading to 100 lbs/acre/day coupled should effectively prevent such odors.

Irrigation with high strength wastewater results in high BOD loading on the day of application. If the rate of oxygen transfer into the soil is not adequate, resulting anaerobic soil conditions can mobilize soil metals such as iron and manganese, which migrate to groundwater. The California League of Food Processors *Manual of Good Practice for Land Application of Food Processing/Rinse Water* recommends an oxygen transfer model to determine acceptable total oxygen demand (biological plus nitrogenous oxygen demand) loading rates. Although the model is detailed and supported in the literature, a site-specific model was not included in the RWD. Therefore, it is appropriate to limit the peak daily BOD loading to the maximum allowable cycle average loading multiplied by the length of the cycle. The discharger uses a typical cycle length of eight days, so it is appropriate to limit the peak daily BOD loading to 800 lb/ac/day. This should be achievable with careful management of the wastewater land application area.

36. Acidic and/or reducing soil conditions can be detrimental to land treatment system function, and may cause groundwater degradation. If the buffering capacity of the soil is exceeded and soil pH decreases below 5 or the soil becomes reducing, naturally occurring metals (including iron and manganese) may dissolve and degrade underlying groundwater. *Pollution Abatement* recommends that water applied to crops have a pH within 6.4 to 8.4 to protect crops. The pH of the process wastewater typically ranges from 4.0 to 6.0. However, because the turf grass is grown primarily to take up water and nitrogen, the low pH of the wastewater may not be a concern. Additionally, soil pH at the wastewater land

application area is moderately alkaline. Therefore, the soils are expected to adequately buffer the discharge. Accordingly, this Order does not impose effluent limitations for pH.

37. Groundwater beneath the proposed new land application sites exceeds the most stringent of the potentially applicable water quality goals for protecting the beneficial uses of groundwater for several salinity constituents and nitrate. Based on monitoring data for the last four years, the average TDS concentration of the screened process wastewater is approximately 2,300 mg/L, the average FDS concentration is approximately 960 mg/L, the average electrical conductivity is approximately 1,400, the average sodium concentration is approximately 91 mg/L and the average chloride concentration is approximately 177 mg/L. Because of salts already present in the soil, evapoconcentration, leaching, and limited potential for vadose zone attenuation to remove fixed dissolved solids, the proposed discharge could further degrade the underlying groundwater unless salinity loading to the land application sites is controlled. Although background groundwater quality is not currently known, as discussed in Finding 33, the discharge is unlikely to degrade groundwater as long as it is properly managed. Therefore, it is appropriate to impose effluent limits that maintain effluent salinity at its current level to ensure proper management while the Discharger studies whether additional improvements are feasible.
38. It is appropriate for this Order to impose effluent and groundwater limitations that are protective of groundwater quality. It is also appropriate to require that salinity reduction and control measures be implemented as needed to comply with those limitations, and that the Discharger monitor the effectiveness of all salinity reduction measures implemented. The Discharger may need to either increase the land application area or take other steps to reduce wastewater salinity to comply with the groundwater limitations of this Order.
39. Pursuant to California Water Code Section 13263(g), discharge is a privilege, not a right, and issuance of this Order does not create a vested right to continue the discharge. Failure to provide best practicable treatment and control; preclude conditions that threaten pollution, degradation, or nuisance; and protect groundwater quality will be sufficient reason to enforce this Order, modify it, or revoke it and prohibit further discharge.

Basin Plan, Beneficial Uses, and Regulatory Considerations

40. The Water Quality Control Plan for the Sacramento River and San Joaquin River Basins, Fourth Edition revised September 2004, (hereafter Basin Plan) designates beneficial uses, establishes water quality objectives, contains implementation plans and policies for protecting waters of the basin, and incorporates by reference plans and policies adopted by the State Water Resources Control Board (State Water Board). Pursuant to Section 13263(a) of the California Water Code, waste discharge requirements must implement the Basin Plan.
41. Surface water drainage is to Willow Slough, which is tributary to the Yolo Bypass. The Basin Plan designates the beneficial uses of the Yolo Bypass as agricultural supply; water contact recreation; non-contact water recreation; warm freshwater habitat; cold freshwater

habitat; migration of warm and cold water aquatic organisms; spawning, reproduction, and/or early development of warm water aquatic organisms; and wildlife habitat.

42. The beneficial uses of underlying groundwater are municipal and domestic water supply, agricultural supply, industrial service supply, and industrial process supply.
43. State Water Board Resolution No. 68-16 prohibits degradation of groundwater quality unless it has been shown that:
 - a. The degradation is consistent with the maximum benefit to the people of the State;
 - b. The degradation will not unreasonably affect present and anticipated future beneficial uses;
 - c. The degradation does not result in water quality less than that prescribed in state and regional policies, including violation of one or more water quality objectives; and
 - d. The discharger employs best practicable treatment and control to minimize degradation.
44. The Discharger has installed a finer wastewater screen, expanded the wastewater land application area, installed a sprinkler irrigation system, and planted perennial grass in the wastewater land application area. These changes have reduced the salinity load to the wastewater land application area and provided nitrogen removal.

As noted in Finding No. 31, the facility water supply is hard (255 mg/L as calcium carbonate) and moderately saline with an average electrical conductivity of about 1,000 umhos/cm. The reverse osmosis (RO) water treatment units are small and are used in lieu of conventional ion exchange water softeners. They do not add salinity and may act as salinity source control measures. Most of the deionized water provided by the RO systems will be discharged in the facility's waste streams along with the RO reject brine, so there should be little or no increase in salinity from use of the RO systems. The boiler is about twice the size of a typical residential water heater and is not used continuously. Because the boiler supply water has been deionized by RO, the Discharger can minimize the use of anti-scaling chemicals in the boiler, resulting in blowdown that is less saline than that of boilers using softened water. For this facility, the use of the RO systems instead of traditional ion exchange water softening is an acceptable best practicable treatment and control method.

The RWD did not specify any further plans to implement additional measures to reduce the salinity of the discharge. There are several other methods available to further reduce the potential for groundwater degradation, which the Discharger did not propose to implement. These include:

- a. Obtain additional land to allow further dilution of the waste in combination with supplemental fresh water for crop irrigation; and
- b. Segregation and separate handling of high-salinity waste streams.

The discharge, if properly managed, is unlikely to degrade groundwater. This Order prohibits degradation, although the groundwater may not be an existing high quality water with respect to salinity. In addition, this Order requires the Discharger to conduct a study of measures that may further reduce salinity in its waste stream, including the two listed above, and requires the Discharger to implement measures that constitute "best practicable treatment or control" pursuant to State Water Board Resolution No. 68-16. Accordingly, this Order complies with State Water Board Resolution No. 68-16.

45. Federal regulations for storm water discharges promulgated by the U.S. Environmental Protection Agency (40 CFR Parts 122, 123, and 124) require specific categories of facilities which discharge storm water to obtain NPDES permits. Based on the Standard Industrial Classification (SIC) code, the Discharger is not required to obtain coverage under the State Water Board's Water Quality Order No. 97-03-DWQ. The RWD describes certain storm water best management practices (BMPs). This order requires that those BMPs be implemented, and includes a prohibition against release of storm water runoff from the wastewater land application area to protect surface water quality.
46. Section 13267(b) of California Water Code provides that: *"In conducting an investigation specified in subdivision (a), the regional board may require that any person who has discharged, discharges, or is suspected of discharging, or who proposes to discharge within its region, or any citizen or domiciliary, or political agency or entity of this state who has discharged, discharges, or is suspected of discharging, or who proposes to discharge waste outside of its region that could affect the quality of the waters of the state within its region shall furnish, under penalty of perjury, technical or monitoring program reports which the board requires. The burden, including costs of these reports, shall bear a reasonable relationship to the need for the reports and the benefits to be obtained from the reports."*

The monitoring and reporting program required by this Order and the attached Monitoring and Reporting Program No. R5-2008-0158 are necessary to assure compliance with these waste discharge requirements. The Discharger owns and operates the facility that discharges the waste subject to this Order.

47. The facility has been in operation since 1972, and its continued operation is therefore exempt from the provisions of the California Environmental Quality (CEQA).
48. The action to adopt revised waste discharge requirements for the facility is exempt from the provisions of CEQA in accordance with Title 14 CCR, Section 15301 because the facility predates CEQA, and the WDRs do not envision or permit expansion of, or significant changes to, the facility or its operations.
49. The discharge authorized herein and the treatment and storage facilities associated with the discharge are exempt from the requirements of Title 27, California Code of Regulations (CCR), Section 20005 et seq. (hereafter Title 27). The exemption, pursuant to Section 20090(b) of Title 27, is based on the following:

- a. The Regional Water Board is issuing waste discharge requirements;
- b. The discharge complies with the Basin Plan; and
- c. The waste does not need to be managed according to Title 22, CCR, Division 4.5, and Chapter 11, as a hazardous waste.

Public Notice

50. All of 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.
51. 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.
52. All comments pertaining to the discharge were heard and considered in a public meeting.

IT IS HEREBY ORDERED that, pursuant to Sections 13263 and 13267 of the California Water Code, Syngenta Seeds, Inc., its agents, successors, and assigns, in order to meet the provisions contained in Division 7 of the California Water Code and regulations adopted thereunder, shall comply with the following:

Note: Other prohibitions, conditions, definitions, and some methods of determining compliance are contained in the attached "Standard Provisions and Reporting Requirements for Waste Discharge Requirements" dated 1 March 1991.

A. Discharge Prohibitions:

1. Land application of wastewater¹ to areas other than those shown on Attachment B is prohibited unless expressly approved by the Executive Officer.
2. Bypassing any treatment system (including screens) is prohibited.
3. Discharge of wastes to surface waters or surface water drainage courses is prohibited.
4. Discharge of irrigation tailwater from the wastewater land application area to any off-site area or drainage course is prohibited.

¹ For the purposes of these discharge requirements, "wastewater" means any liquid waste from seed processing, washing and sterilization of seedling trays, greenhouse cooling systems, and/or any other process that is discharged to the land application area.

5. Discharge of waste classified as hazardous, as defined in Section 2521(a) of Title 23, CCR, Section 2510, et seq., (hereafter Chapter 15), or 'designated', as defined in Section 13173 of the California Water Code, is prohibited.

B. Discharge Specifications:

1. The total annual wastewater flow shall not exceed 493,000 gallons/year.
2. Objectionable odors originating at the facility (including the wastewater land application area and fields that receive residual solids) shall not be perceivable beyond the property limits.
3. As a means of discerning compliance with Discharge Specification No. 2, the dissolved oxygen content in the upper one foot of any tank that contains process wastewater will be considered.
4. The Discharger shall operate all systems and equipment to maximize treatment of wastewater and optimize the quality of the discharge.
5. The wastewater land application area shall be managed to prevent breeding of mosquitoes and other vectors. Specifically:
 - a. All wastewater applied to land must infiltrate completely within 24 hours.
 - b. Low-pressure pipelines, unpressurized pipelines, and ditches that are accessible to mosquitoes shall not be used to store wastewater.
6. All treatment, storage, and disposal facilities shall be designed, constructed, operated, and maintained to prevent inundation or washout due to floods with a 100-year return frequency.
7. 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 the Groundwater Limitations.
8. The facility shall have sufficient treatment, storage, and disposal capacity to accommodate allowable wastewater flow and design seasonal precipitation. 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.
9. Neither the treatment nor the discharge of waste shall cause a condition of nuisance or pollution as defined by the California Water Code, Section 13050.

C. Effluent Limitations

1. The electrical conductivity of the wastewater (or wastewater combined with supplemental irrigation water) discharged to the land application area shall not exceed 1,500 umhos/cm as a flow-weighted yearly average.
2. The chloride concentration of the wastewater (or wastewater combined with supplemental irrigation water) discharged to the land application area shall not exceed 200 mg/L as a flow-weighted yearly average.
3. The maximum BOD₅ loading to each wastewater land application area irrigation check shall not exceed any of the following:
 - a. 800 lbs/acre on any single day;
 - b. 100 lbs/acre/day as a 8-day cycle average; and
 - c. The daily and 8-day cycle average loading rate that ensures compliance with Discharge Specifications B.2 and B.9 and the Groundwater Limitations.

Loading calculations shall be performed as specified in the attached Monitoring and Reporting Program No. R5-2008-0158, which is a part of this Order.

4. The total nitrogen loading to each wastewater land application area irrigation check shall not exceed the agronomic rate for plant available nitrogen (PAN) for the type of crop to be grown, as specified in the most recent edition of the Western Fertilizer Handbook. PAN shall be calculated as 83 percent of the total nitrogen content of the waste plus the total nitrogen contribution from supplemental fertilizers. As described in Finding No. 17, PAN must not exceed 260 pounds per acre per year if turf grass is grown on the land application area.

D. Wastewater Land Application Area Specifications

1. Hydraulic loading of wastewater (and supplemental fresh water) to the land application areas shall be at rates designed to minimize percolation of waste constituents below the evaporative and root zones, except as needed to promote surface soil chemistry that is consistent with sustainable agricultural land uses.
2. The Discharger shall maximize use of the available land application area to minimize waste constituent loading rates.
3. Crops shall be grown on the land application area each year. Crops shall be selected based on nutrient uptake capacity, tolerance of anticipated soil conditions, water needs, and evapotranspiration rates. All crops shall be harvested and the cuttings removed from the land application area at least once per year.

4. At a minimum, there shall be a 7-day drying/resting period between wastewater applications.
5. The irrigation system shall be designed and managed to ensure even application of wastewater over each irrigation field and prevent the discharge of tailwater and overspray outside of the land application area.
6. Irrigation with wastewater shall not be performed within 24 hours before a predicted storm, during precipitation, or within 24 hours after the end of any precipitation event, nor shall it be performed when the ground is saturated.
7. If sprinkler systems are used, wastewater shall not be applied to land when the wind speed exceeds 30 mph.
8. The irrigation force main shall be completely flushed with fresh water immediately after cessation of operations for 24 hours or more.
9. There shall be no standing water in any portion of the land application area more than 24 hours after application of wastewater ceases.
10. The discharge shall not cause the buffering capacity of the soil profile to be exceeded nor shall it cause the soil to become reducing.
11. The Discharger shall provide and maintain the following setbacks for the wastewater land application area:

<u>Setback Definition</u>	<u>Surface Irrigation Setback (feet)</u>
Edge of irrigated area ¹ to public property (e.g., street)	10
Edge of irrigated area to other agricultural property	5 ²
Edge of irrigated area to occupied residence	50
Edge of irrigated area to irrigation well	50 ³
Edge of irrigated area to domestic well	100 ³

¹ As defined by the wetted area produced during irrigation.

² Unless off-site discharge is prevented by topography or berms. In such cases, no setback is required.

³ Unless otherwise expressly approved by the Executive Officer.

12. Application of process wastewater shall only occur where the field and irrigation system are maintained to provide uniform water distribution, minimize ponding, and provide complete tailwater control.

13. If flood irrigation is used, check runs shall be no longer, and slopes shall be no greater, than that which permits uniform infiltration and maximum practical irrigation efficiency.
14. Tailwater ditches, if used, shall be maintained free of emergent, marginal, and floating vegetation.
15. Following the last day of processing, but **no later than 30 October each year**, the process area slabs shall be washed down to remove residual organic matter and the septic tanks shall be drained and cleaned.

E. Solids Disposal Requirements

1. If disposed of off-site, solids shall be disposed of in compliance with the *Consolidated Regulations for Treatment, Storage, Processing, or Disposal of Solid Waste*, as set forth in Title 27, CCR, Division 2, Subdivision 1, Section 20005, et seq.
2. Collected screenings, sludge, and other solids applied to land shall be managed in accordance with an approved *Solids Management Plan* submitted pursuant to Provision G.1.a.
3. Any proposed change in solids use or disposal practice shall be reported to the Executive Officer by submittal of a revised *Solids Management Plan* at least **90 days** in advance of the change.
4. Solids shall not be applied to land when the land application area is saturated.
5. Solids shall be applied at agronomic rates for nutrients, and the application rate shall be selected to prevent vector attraction and nuisance odors.
6. Solids shall be evenly applied and incorporated into the soil by disking as necessary to prevent nuisance conditions.
7. The total nitrogen loading to each solids land application area shall not exceed the agronomic rate for plant available nitrogen (PAN) for the type of crop to be grown, as specified in the most recent edition of the Western Fertilizer Handbook. PAN shall be calculated as 83 percent of the total nitrogen content of the waste plus the total nitrogen contribution from supplemental fertilizers.

F. Groundwater Limitations:

The discharge shall not cause underlying groundwater to contain any chemical constituent in concentrations greater than background groundwater quality.

G. Provisions:

1. The following reports shall be submitted pursuant to Section 13267 of the California Water Code and shall be prepared as described in Provision G.2:
 - a. By **30 November 2008**, the Discharger shall submit a *Solids Management Plan* that describes the specific loading rates, practices, application area(s), and operational procedures that will be used to ensure that the land application of waste solids does not cause nutrient overloading, nuisance odors, or promote vector breeding. The plan shall be based in part on solids monitoring data obtained during 2007.
 - b. By **28 February 2009**, the Discharger shall submit a *Salinity Evaluation and Minimization Plan* for review and approval. At a minimum, the plan shall include the following:
 - i. An estimate of all of the pollutant sources contributing, or potentially contributing, to salinity in the process wastewater including water supply, water softeners, boilers, and chemicals used at the facility.
 - ii. A description and analysis of methods that could be used singly or in combination to reduce the salinity of the process wastewater to 1,000 umhos/cm or less as a flow-weighted average, including innovative and alternative approaches. The analysis shall also identify sources of salinity that are not within the ability of the Discharger to control.
 - iii. An estimate of salinity reduction that may be achieved through the methods identified in subparagraph ii.
 - iv. A plan for monitoring the results of the salinity minimization program.
 - v. A description of the tasks, costs, and time required to investigate and implement various elements in the plan. Include a specific schedule.
 - vi. A statement of the Discharger's salinity pollution prevention goals and strategies, including priorities for short-term and long-term action, and a description of the Discharger's intended pollution prevention activities for the immediate future.
 - vii. A description of the Discharger's existing salinity pollution prevention programs.
 - viii. An analysis, to the extent feasible, of any adverse environmental impacts, including cross-media impacts or substitute chemicals that may result from the implementation of the salinity minimization program.
 - ix. An analysis, to the extent feasible, of the costs and benefits that may be incurred to implement the salinity minimization program.

The Discharger shall implement the plan within **90 days** of submittal or within **60 days** of the Executive Officer's approval, whichever occurs first. Progress in implementation of the plan shall be reported each year in the Annual Monitoring Report required pursuant to Monitoring and Reporting Program No. R5-2008-0158.

2. All technical reports required herein that involve planning, investigation, evaluation, or design, or other work requiring interpretation and proper application of engineering or geological 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 section 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 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.
3. The Discharger shall comply with Monitoring and Reporting Program No. R5-2008-0158, which is a part of this Order, and any revisions thereto as ordered by the Executive Officer.
4. The Discharger shall comply with the "Standard Provisions and Reporting Requirements for Waste Discharge Requirements", dated 1 March 1991, which are attached hereto and by reference a part of this Order. This attachment and its individual paragraphs are commonly referenced as "Standard Provision(s)."
5. The Discharger shall submit to the Regional Water Board on or before each compliance report due date, the specified document or, if appropriate, a written report detailing compliance or noncompliance with the specific schedule date and task. If noncompliance is being reported, then the Discharge shall state the reasons for such noncompliance and provide an estimate of the date when the Discharger will be in compliance. The Discharger shall notify the Regional Water Board in writing when it returns to compliance with the time schedule.
6. As described in the Standard Provisions, the Discharger shall report promptly to the Regional Water Board any material change or proposed change in the character, location, or volume of the discharge.
7. At least 90 days prior to termination or expiration of any lease, contract, or agreement involving the processing facility or land application areas that is used to justify the capacity authorized herein and assure compliance with this Order, the Discharger shall notify the Regional Water Board in writing of the situation and of what measures have been taken or are being taken to assure full compliance with this Order.
8. In the event of any change in control or ownership of the facility or land application areas, the Discharger must notify the succeeding owner or operator of the existence of this Order by letter, a copy of which shall be immediately forwarded to this office. To

assume operation as Discharger 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 name and 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. Transfer shall be approved or disapproved by the Executive Officer.

9. The Discharger shall comply with all conditions of this Order, including timely submittal of technical and monitoring reports as directed by the Executive Officer. 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.
10. A copy of this Order shall be kept at the discharge facility for reference by operating personnel. Key operating personnel at the facility shall be familiar with its contents.
11. The Regional Water Board will review this Order periodically and will revise requirements when necessary.

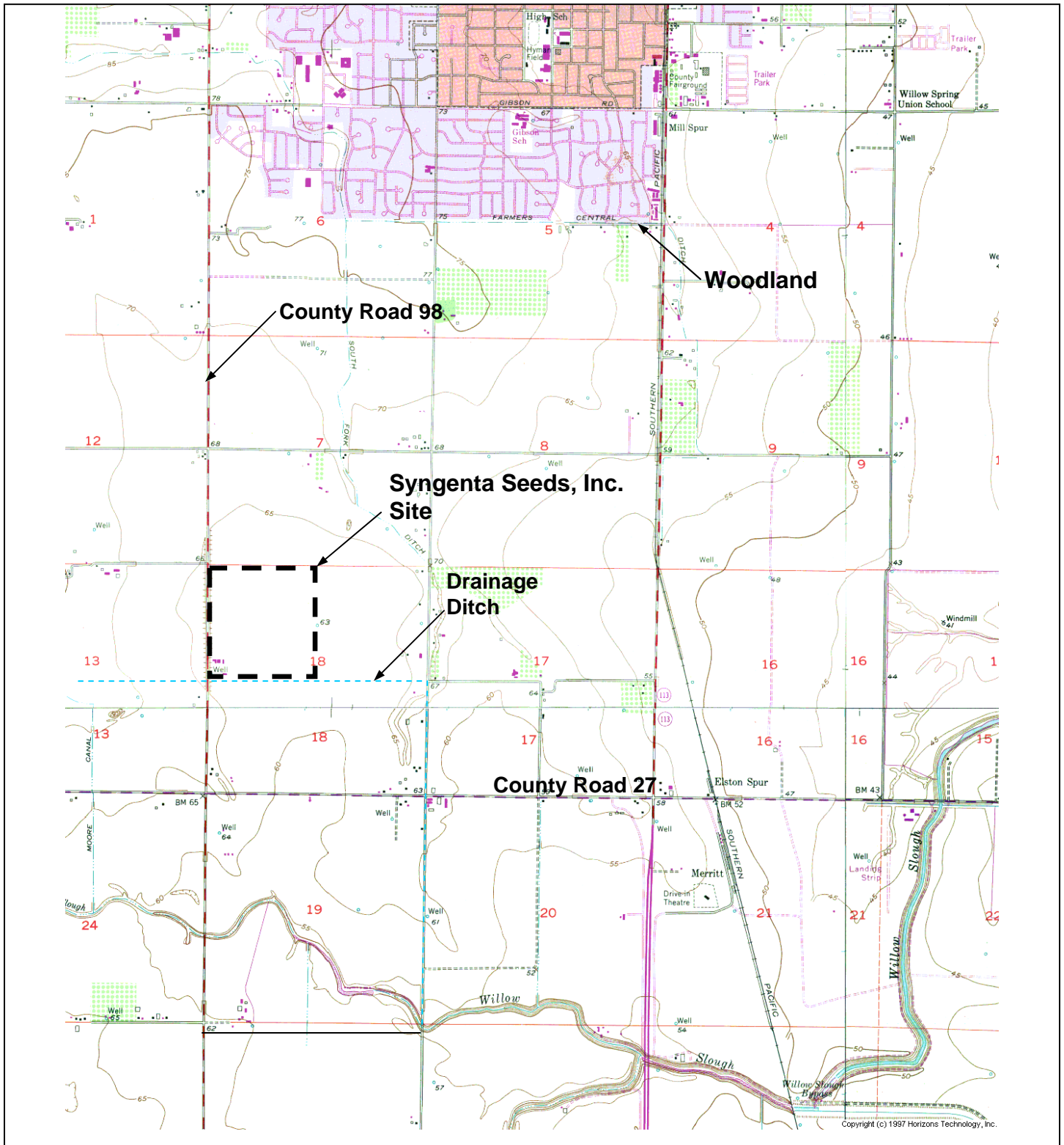
I, Pamela C. Creedon, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Central Valley Region, on 23 October 2008.

PAMELA C. CREEDON, Executive Officer

AMENDED

ALO:11/04/2008

ATTACHMENT A



Drawing Reference:
USGS 7.5 minute
quad map. Woodland,
CA

LOCATION MAP
SYNGENTA SEEDS, INC.
WOODLAND SEED PROCESSING FACILITY
YOLO COUNTY

ORDER NO. R5-2008-0158



Approx. Scale:
1" = 3,400'

ATTACHMENT B



Drawing Reference:
Google Maps, Report of
Waste Discharge

● Soil Boring Location

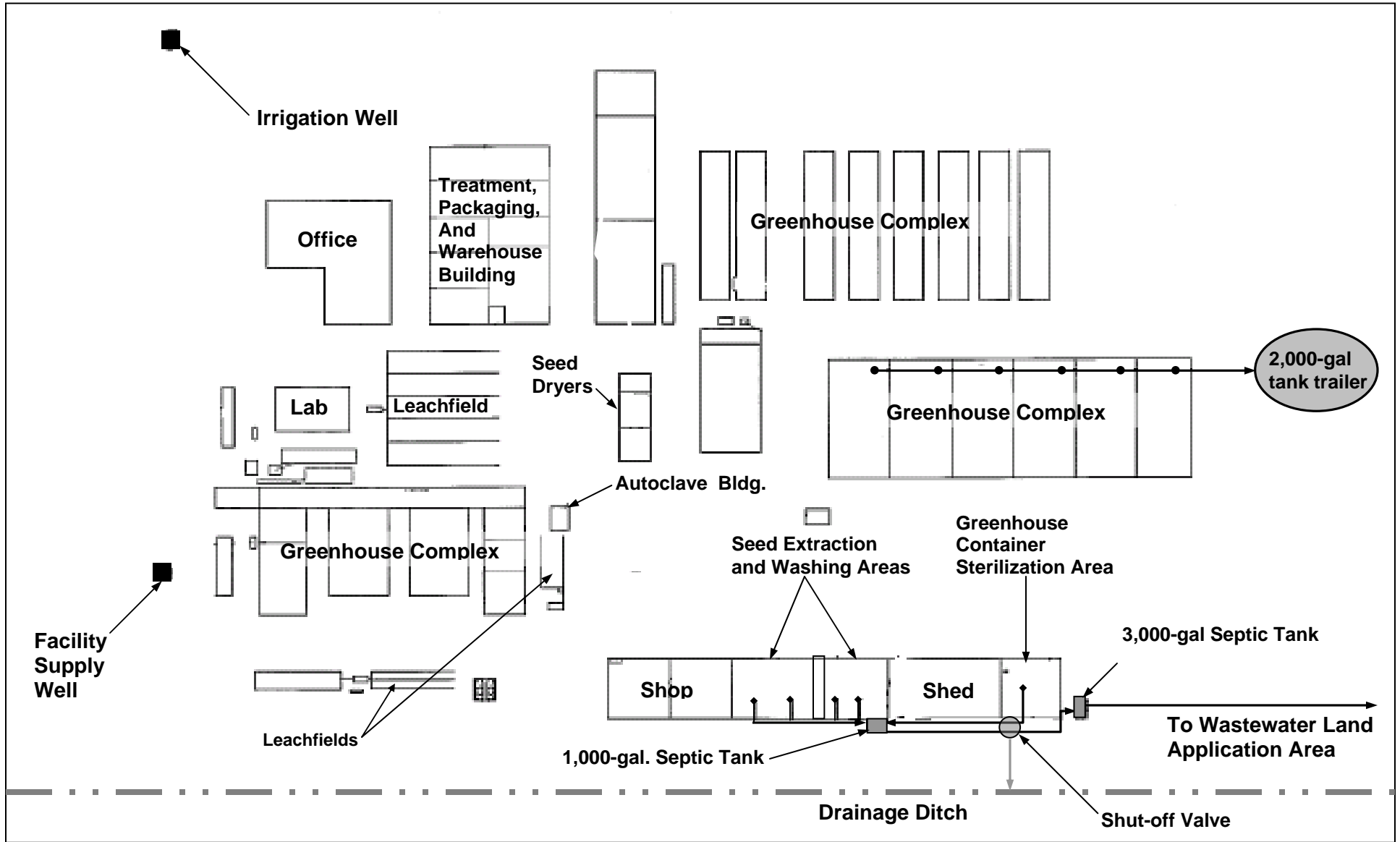
SITE PLAN
SYNGENTA SEEDS, INC.
WOODLAND SEED PROCESSING FACILITY
YOLO COUNTY

ORDER NO. R5-2008-0158



Approx. Scale:
1" = 550'

ATTACHMENT C




Drawing Reference:
 2007 Annual Monitoring Report
 Brown and Caldwell
 17 December 2007

PROCESSING AREA PLAN
 SYNGENTA SEEDS, INC.
 WOODLAND SEED PROCESSING FACILITY
 YOLO COUNTY

ORDER NO. R5-2008-0158

N



Approx. Scale:
 1" = 90'

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM NO. R5-2008-0158
FOR
SYNGENTA SEEDS, INC.
WOODLAND SEED PROCESSING FACILITY
YOLO COUNTY

The Discharger shall comply with this Monitoring and Reporting Program (MRP), which describes requirements for monitoring process wastewater, supplemental irrigation water, waste solids, and land application areas. This MRP is issued pursuant to Water Code Section 13267. The Discharger shall not implement any changes to this MRP unless and until a revised MRP is issued by the Executive Officer.

All samples shall be representative of the volume and nature of the discharge or matrix of material sampled. The time, date, and location of each grab sample shall be recorded on the sample chain of custody form. Field test instruments (such as those used to measure pH and dissolved oxygen) may be used provided that:

1. The operator is trained in proper use and maintenance of the instruments;
2. The instruments are field-calibrated prior to each monitoring event;
3. The instruments are serviced and/or calibrated by the manufacturer at the recommended frequency; and
4. Field calibration reports are submitted as described in the "Reporting" section of the MRP.

WASTEWATER MONITORING

Wastewater samples shall be collected at a point in the system downstream of the screen and upstream of the wastewater land application area. Sampling is not required during periods when no wastewater is discharged to the land application area. Grab samples collected from a pipeline or sump pit will be considered representative. At a minimum, the Discharger shall monitor the wastewater as follows:

<u>Constituent/Parameter</u>	<u>Units</u>	<u>Sample Type</u>	<u>Sampling Frequency</u>	<u>Reporting Frequency</u>
pH	pH units	Grab	Weekly	Monthly
Electrical Conductivity	umhos/cm	Grab	Weekly	Monthly
Total Dissolved Solids	mg/L	Grab	Weekly	Monthly
Fixed Dissolved Solids	mg/L	Grab	Weekly	Monthly
BOD ₅ ¹	mg/L	Grab	Weekly	Monthly
Total Kjeldahl Nitrogen	mg/L	Grab	Weekly	Monthly
Nitrate Nitrogen	mg/L	Grab	Weekly	Monthly
Ammonia Nitrogen	mg/L	Grab	Weekly	Monthly
Sodium	mg/L	Grab	Monthly	Monthly

<u>Constituent/Parameter</u>	<u>Units</u>	<u>Sample Type</u>	<u>Sampling Frequency</u>	<u>Reporting Frequency</u>
Chloride	mg/L	Grab	Monthly	Monthly

¹ 5-day, 20°C Biochemical Oxygen Demand.

SUPPLEMENTAL IRRIGATION WATER MONITORING

If supplemental fresh water is used to irrigate the wastewater land application area, the Discharger shall monitor the supplemental irrigation supply water. Sampling is not required during periods when no water is discharged to the land application areas. Samples of supplemental irrigation water may be collected at any point between the wellhead and the wastewater land application area. Grab samples will be considered representative. At a minimum, the Discharger shall monitor the supplemental irrigation supply water as follows:

<u>Constituent/Parameter</u>	<u>Units</u>	<u>Sample Type</u>	<u>Sampling Frequency</u>	<u>Reporting Frequency</u>
pH	pH units	Grab	Monthly	Monthly
Electrical Conductivity	umhos/cm	Grab	Monthly	Monthly
Total Dissolved Solids	mg/L	Grab	Monthly	Monthly
Fixed Dissolved Solids	mg/L	Grab	Monthly	Monthly
Total Kjeldahl Nitrogen	mg/L	Grab	Monthly	Monthly
Nitrate Nitrogen	mg/L	Grab	Monthly	Monthly
Sodium	mg/L	Grab	Monthly	Monthly
Chloride	mg/L	Grab	Monthly	Monthly

FLOW MONITORING

The Discharger shall monitor wastewater and supplemental irrigation water flows as follows:

<u>Flow Source</u>	<u>Units</u>	<u>Type of Measurement</u>	<u>Monitoring Frequency</u>	<u>Reporting Frequency</u>
Daily subtotal to each irrigation field or check:	gpd	Meter	Daily ¹	Monthly
Wastewater	and inches	Observation/		
Supplemental irrigation water		Calculation		
Total water				

¹ Calculated based on total daily flows, flow rates, checks in use, and length of set time for each check.

WASTE SOLIDS MONITORING

Samples of solids removed from the processing area and wastewater screen shall be collected just prior to discharge to the solids application area. Sampling is not required during periods when no solids are discharged to the land application area. Grab samples collected from a bin or transport vehicle will be considered representative. At a minimum, the Discharger shall monitor the solids as follows:

<u>Constituent/Parameter</u>	<u>Units</u>	<u>Sample Type</u>	<u>Sampling Frequency</u>	<u>Reporting Frequency</u>
Total weight discharged	tons ¹	Calculated	Daily	Monthly
Total solids	mg/Kg	Grab	Monthly	Monthly
Total organic carbon	mg/Kg ²	Grab	Monthly	Monthly
Total nitrogen	mg/Kg ²	Grab	Monthly	Monthly

¹ May be estimated based on volume (cubic yards) and typical wet density, if known. Report as both wet weight and dry weight.

² Results shall be reported on both a wet weight and dry weight basis.

WASTEWATER LAND APPLICATION AREA MONITORING

A. Daily Field Inspections

The Discharger shall inspect the wastewater land application area at least once daily prior to and during irrigation events, and observations from those inspections shall be documented for inclusion in the monthly monitoring reports. The following items shall be documented for each check or field to be irrigated on that day:

1. Runoff control berm condition;
2. Condition of each sprinkler head and flow control valve;
3. Soil saturation, ponding, and evidence of soil clogging;
4. Potential runoff to off-site areas and/or surface water;
5. Accumulation of organic solids at soil surface;
6. Odors that have the potential to be objectionable at or beyond the property boundary; and
7. Insects.

A copy of entries made in the log during each month shall be submitted as part of the Monthly Monitoring Report.

B. Routine Monitoring

The Discharger shall perform the following routine monitoring and loading calculations during all months when land application of wastewater occurs, and shall present the data in the Monthly and Annual Monitoring Reports.

<u>Constituent</u>	<u>Units</u>	<u>Type of Sample</u>	<u>Sampling Frequency</u>	<u>Reporting Frequency</u>
Precipitation	0.1 in.	Rain Gauge ¹	Daily	Monthly, Annually
Irrigation checks receiving wastewater	--	Observation	Daily	Monthly, Annually
Hydraulic loading rate: Wastewater Fresh water Total	Gallons and inches	Calculated ²	Daily	Monthly, Annually
BOD ₅ loading rate Peak daily Cycle average	lb/ac/day	Calculated ^{2, 3}	Daily	Monthly, Annually
Cumulative nitrogen loading rate Wastewater Fresh water Total	lb/ac	Calculated ^{2, 4}	Daily	Monthly, Annually
Cumulative (to date) flow-weighted electrical conductivity (wastewater and fresh water)	mg/L	Calculated ^{2, 4}	Monthly	Monthly, Annually

¹ Data obtained from the nearest National Weather Service rain gauge is acceptable.

² Rate shall be calculated for each irrigation check.

³ BOD₅ shall be calculated using the daily applied volume of wastewater, actual application area, and the average of the three most recent BOD₅ results.

⁴ Total nitrogen and TDS loading rates shall be calculated as a flow-weighted average using the applied volume of wastewater, actual application area, and effluent monitoring results.

⁵ Loading rates for supplemental nitrogen shall be calculated using the actual load and the application area.

WASTE SOLIDS LAND APPLICATION AREA MONITORING

A. Daily Field Inspections

The Discharger shall inspect the waste solids land application area at least once daily prior to and during land application, and observations from those inspections shall be documented for

inclusion in the monthly monitoring reports. The following items shall be documented for each check or field to be used on that day:

1. Accumulation of organic solids at soil surface;
2. Odors that have the potential to be objectionable at or beyond the property boundary; and
3. Insects.

A copy of entries made in the log during each month shall be submitted as part of the Monthly Monitoring Report.

B. Routine Monitoring

The Discharger shall perform the following routine monitoring and loading calculations during all months when land application of solids occurs, and shall present the data in the Monthly and Annual Monitoring Reports.

<u>Constituent</u>	<u>Units</u>	<u>Type of Sample</u>	<u>Sampling Frequency</u>	<u>Reporting Frequency</u>
Fields receiving solids (depict on scaled map)	--	Observation	Daily	Monthly, Annually
Application rate:				
Wet	tn/ac, inches	Calculated ¹	Daily	Monthly, Annually
Dry	tn/ac			
Cumulative nitrogen loading rate	lb/ac	Calculated ¹	Daily	Monthly, Annually

¹ Rates shall be calculated for each field.

REPORTING

In reporting monitoring data, the Discharger shall arrange the data in tabular form so that the date, sample type (e.g. effluent, groundwater), sampling location, and the reported analytical result for each sample are readily discernible. The data shall be summarized in such a manner to clearly illustrate compliance with waste discharge requirements and spatial or temporal trends, as applicable. The results of any monitoring done more frequently than required at the locations specified in the Monitoring and Reporting Program shall be reported in the next scheduled monitoring report.

A. Monthly Monitoring Reports

Monthly reports shall be submitted to the Regional Board on the **1st day of the second month following sampling** (i.e., the January report is due by 1 March). Monthly Monitoring

Reports shall be submitted regardless of whether there is any process wastewater generated. At a minimum, the reports shall include:

1. Results of wastewater, supplemental irrigation water, waste solids, flow, and all land application area monitoring. Data shall be presented in tabular format.
2. Daily precipitation data in tabular form accompanied by starting and ending dates of irrigation for each field or check.
3. Daily field inspection reports.
4. A comparison of monitoring data to the discharge specifications and applicable limitations and an explanation of any violation of those requirements.
5. When requested by staff, copies of laboratory analytical report(s).
6. Calibration log(s) verifying calibration of any field monitoring instruments (e.g., DO, pH, and EC meters) used to obtain data.
7. Daily discharge volumes and acres irrigated shall be tabulated. The report shall include a discussion of the discharge volumes and irrigation practices used (water source, method of application, application period/duration, drying times, etc.) for each check or group of checks utilized during the month. Hydraulic loading rates (inches/acre/month) shall be calculated.
8. Maximum daily BOD₅ loading rates (lbs/acre/day) shall be calculated for each irrigation check using the total volume applied on the day of application, estimated application area, and a running average of the three most recent results of BOD₅ for the applicable source water, which also shall be reported along with supporting calculations. Cycle average BOD₅ loading rates shall be calculated using the total volume applied on the day of application, the number of days between applications, the total application period, application area, and a running average of the three most recent results of BOD₅ for the wastewater.
9. Total nitrogen loading rates (lbs/acre/month) shall be calculated for each irrigation check on monthly basis using the daily applied volume of wastewater, daily application area, and the most recent monitoring results, which shall also be reported along with supporting calculations.
10. Nitrogen loading rates for other sources (i.e., fertilizers) shall be calculated for each irrigation check on a monthly basis using the daily applied load and the estimated daily application area.
11. Cumulative nitrogen loading rates for each irrigation check for the calendar year to date shall be calculated as a running total of monthly loadings to date from all sources.

12. Flow-weighted average electrical conductivity and chloride concentration shall be calculated based on year-to-date flow, wastewater, and supplemental irrigation water monitoring results.

B. Annual Monitoring Report

An Annual Report shall be submitted to the Regional Board by **1 February** each year. The Annual Report shall include the following:

1. Tabular and graphical summaries of historical monthly total loading rates for water (hydraulic loading in gallons and inches), BOD, and total nitrogen solids applied to the wastewater land application area.
2. The flow-weighted average electrical conductivity and chloride concentration of the wastewater shall be calculated based on measured daily flows; and wastewater, and supplemental irrigation water monitoring results for the year.
3. For each violation of the Effluent Limitations of this Order, the report shall describe in detail the nature of the violation, date(s) of occurrence, cause(s), mitigation or control measures taken to prevent or stop the violation, and additional operational or facility modifications that will be made to ensure that the violation does not occur in the following year.
4. A comprehensive evaluation of the effectiveness of the past year's wastewater application operation in terms of odor control, including consideration of application management practices (i.e.: waste constituent and hydraulic loadings, application cycles, drying times, and cropping practices), soil profile monitoring data and groundwater monitoring data.
5. A narrative description of solids disposal practices, including identification of the fields where solids were applied, the total nitrogen applied to each field during the year, typical application depths and incorporation practices, any nuisance conditions that occurred, and corrective actions taken to remedy nuisance conditions, if any.
6. A discussion of compliance and the corrective action taken, as well as any planned or proposed actions needed to bring the discharge into full compliance with the waste discharge requirements.
7. A discussion of any data gaps and potential deficiencies/redundancies in the monitoring system or reporting program.

A letter transmitting the self-monitoring reports shall accompany each report. The letter shall include a discussion of requirement violations found during the reporting period, and actions taken or planned for correcting noted violations, such as operation or facility modifications. If the Discharger has previously submitted a report describing corrective actions and/or a time schedule for implementing the corrective actions, reference to the previous correspondence will be satisfactory. The transmittal letter shall contain the certification statement by the

MONITORING AND REPORTING PROGRAM NO. R5-2008-0158
SYNGENTA SEEDS, INC.
WOODLAND SEED PROCESSING FACILITY
YOLO COUNTY

-8-

Discharger or the Discharger's authorized agent, as described in the Standard Provisions
General Reporting Requirements Section B.3.

The Discharger shall implement the above monitoring program as of the date of this Order.

Ordered by: _____
PAMELA C. CREEDON, Executive Officer

_____ 23 October 2008
(date)

ALO:11/4/2008

INFORMATION SHEET

ORDER NO. R5-2008-0158
SYNGENTA SEEDS, INC.
WOODLAND SEED PROCESSING FACILITY
YOLO COUNTY

Syngenta Seeds, Inc. operates a seed crop production and seed washing facility on a 160-acre parcel 1.5 miles south of Woodland. In April 2004, the Yolo County Environmental Health Department discovered that Syngenta Seeds, Inc. was discharging process wastewater to a drainage ditch that flows to Willow Slough, and referred the Discharger to the Regional Water Board to obtain WDRs. The facility has been in operation since 1972, but information about historical ownership and waste management practices is not available. The current owner (the Discharger) had been discharging process wastewater to leachfields and an adjacent drainage ditch that drains to Willow Slough for an unknown time. The Discharger ceased the discharge to surface waters on request and began land-applying wastewater in accordance with an interim operations plan submitted in June 2004 pending adoption of WDRs.

Since then, the Discharger has consolidated outdoor processing into a single area, installed a finer wastewater screen, expanded the wastewater land application area, installed a sprinkler irrigation system, and planted perennial grass in the wastewater land application area. These changes have reduced waste constituent loadings, and there have been no complaints about the Discharger's operations since the original referral by Yolo County.

The Discharger grows peppers, tomatoes, watermelons, cantaloupe, and squash on approximately 130 acres, including several greenhouses. Beginning in July and continuing intermittently through October, the crops are harvested and processed to remove their seeds. The amount of fruit processed each year has varied from 88 to 173 tons for the last three years.

Seed processing takes place outdoors on concrete slabs that drain to a septic tank. Process wastewater is screened to remove solids before it is pumped to the wastewater land application area sprinkler system. The total annual wastewater volume ranged from 197,000 to 400,000 gallons per year for the last four years. Screened solids are collected in a bin for land application with the other residual solids removed during processing.

The greenhouses have evaporative cooling systems. Most of them are closed loop systems with no waste discharge. However, six greenhouses generate small volumes of saline water that is drained from the system to reduce salt accumulation on the cooling pads. The greenhouse cooling system wastewater is commingled with the process wastewater and applied to land.

The combined process and greenhouse wastewater is typically high in degradable organics, nitrogen, and salinity. Although the high salinity is due in part to salts present in the process water supply and the fruit, various saline chemicals are used to aid in processing, treat the seeds to control microbial diseases, and sterilize seedling trays used in the greenhouses.

The 1.6-acre wastewater land application area is divided into seven irrigation checks. Manual valves are used to control the flow to each check. The land application area was recently planted with perennial rye grass, which is periodically mowed. The cuttings are typically not removed. The Discharger proposes a flow limit of 493,000 gallons per year for the combined

process and greenhouse wastewater, which is equivalent to 11 inches of water per year. The Discharger adds supplemental fresh water as needed to sustain the grass.

Based on information presented in the Report of Waste Discharge (RWD) the estimated cycle average BOD loading is approximately 50 pounds per acre per day, and the estimated peak (or instantaneous maximum) BOD loading is approximately 396 pounds per acre per day. However, due to highly variable daily flows and BOD concentrations, actual BOD loadings in 2007 were as high as 70 pounds per acre per day as a cycle average, and 1,100 pounds per acre per day as a peak daily rate.

A cycle average loading of 100 lb/ac/day and a peak daily loading equal to that value multiplied by the cycle time in days should be sufficient to prevent nuisance and protect groundwater quality. Based on the cycle time proposed in the RWD, the peak daily loading rate should not exceed 800 lb/ac/day. A high peak daily loading rate may not necessarily cause nuisance conditions, particularly if it occurs infrequently and is not the result of organic solids accumulation on the ground surface or sustained ponding of wastewater in the land application area. The Discharger may be able to improve control of the peak daily loading rate by correlating historical BOD concentrations for the type of fruit processed to determine when lower application volumes and shorter cycles are needed to reduce the peak BOD loading.

The estimated total nitrogen load to the wastewater land application area is 280 pounds per acre per year, and approximately 224 pounds per acre per year would be plant available. Typical nitrogen requirements for turf grasses are 225 to 260 pounds per acre per year, so the proposed nitrogen loading rates are not excessive.

The Discharger has designated a land application expansion area to be used if needed to comply with the loading rate limitations of this Order. If wastewater concentrations are similar to previous years, full expansion up to 3.0 acres of land application area should reduce the BOD loading rate to 26 pounds per acre per day as a cycle average, and 634 pounds per acre per day as a peak daily rate. The water loading rate would be about 6 inches per year, and the nitrogen loading rate would be similarly reduced.

Approximately 190 tons of residual fruit solids are applied to the Discharger's cropland each year. A manure spreader is used to apply the solids to the fields, and they are disked within several days to incorporate the waste. The RWD did not provide characterization data for this waste, but it is expected to contain high concentrations of readily degradable organic matter and nitrogen. There is currently no specific land application area or rotation schedule for this discharge, and the RWD did not provide any information regarding typical solids loading rates. Because of the potential for nuisance conditions associated with readily degradable organic matter on the ground surface and groundwater degradation associated with the nitrogen content of this waste, this Order requires that the Discharger submit a *Solids Management Plan* for review and approval.

Domestic wastewater generated at the facility is discharged to a septic system permitted by the Yolo County Environmental Health Department. Three small reverse osmosis systems are used

to treat water supplied to the office and laboratory. The reverse osmosis brine and blowdown from a small boiler are also discharged to the septic system. No chemical analyses are performed in the laboratory.

After the processing season ends, the processing slabs, sumps, and pipelines are flushed with clean water. This rinse water is discharged to the land application area. Storm water runoff from the outdoor processing areas is then allowed to drain to a main drainage ditch along the southern property boundary.

Because the Discharger uses sprinkler irrigation on the wastewater land application area and drip irrigation in the fields and greenhouses, there is essentially no tailwater discharge from the site. Storm water runoff from the entire site drains to north-south trending ditches that discharge to the main drainage ditch. This ditch also receives storm water runoff and tailwater runoff from nearby farms.

There are no shallow groundwater monitoring wells at the site, but the Discharger completed a limited assessment of groundwater quality beneath the current wastewater land application area in September 2006. Groundwater may be found at approximately 25 feet below the ground surface. Groundwater samples obtained in 2006 indicate that groundwater beneath the current land application area exceeds water quality objectives for electrical conductivity, dissolved solids, nitrate nitrogen, and sodium. The limited groundwater data do not conclusively demonstrate the source of the apparently poor shallow groundwater quality at the site. It may be naturally occurring, the result of agricultural practices, the result of the previous discharges, or some combination of the three. The land discharge at the current land application site has been ongoing for only four years at relatively low water application rates. Based on the limited volume of the discharge, the seasonal nature of the discharge, the character of the waste, and site-specific soil and groundwater conditions, discharge has minimal potential to degrade groundwater quality if properly managed. Therefore, groundwater monitoring is not necessary unless the discharge changes significantly, the Discharger fails to achieve its salinity reduction goals, or new information regarding the threat to groundwater quality becomes available. This Order includes effluent limitations that limit the wastewater to current levels and requires that the Discharger develop and implement a salinity minimization plan.

Surface water drainage is to Willow Slough, which is tributary to the Yolo Bypass.

ALO:11/04/08