

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
CENTRAL VALLEY REGION

ORDER NO.

WASTE DISCHARGE REQUIREMENTS  
FOR  
BIOSOLIDS RECYCLING, INC.  
JOSEPH AND CONNIE JESS  
PAUL AND SALLY MARCIEL  
JESS RANCH AND MARCIEL RANCH BIOSOLIDS APPLICATION SITES  
ALAMEDA COUNTY

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

1. Biosolids Recycling, Inc., Joseph and Connie Jess, and Paul and Sally Marciel (hereafter known as “Dischargers”) submitted a Report of Waste Discharge (RWD) dated 20 December 2004 for revision of Waste Discharge Requirements (WDRs) that regulate the discharge of biosolids to land. A revised RWD was received on 15 August 2005.
2. Jess Ranch, which is owned by Joseph and Connie Jess, is at 15850 Jess Ranch Road in eastern Alameda County, as shown on Attachment A, which is attached hereto and made part of the Order by reference. Marciel Ranch, owned by Paul and Sally Marciel, is adjacent to the west side of Jess Ranch. The land application areas are in Sections 24, 25, and 26, T2S, R3E, (MDB&M), and comprise Assessor’s Parcel Nos. 99B-7800-7-4 and -7-8 (Jess) and 99B-7800-1-9 (Marciel).
3. Biosolids Recycling, Inc. obtains and delivers biosolids to the application sites, oversees biosolids application by the land owners, and performs monitoring and reporting related to biosolids application.

**Existing Facility and Discharge**

4. The Dischargers have been applying biosolids to land as a soil amendment at the Jess Ranch (450 acres) since 1992, and at the Marciel Ranch (470 acres) since 1994. Reportedly, Marciel Ranch has not received biosolids since 1996, and Jess Ranch did not receive biosolids from 2000 through 2004. Both sites are currently regulated under WDRs Order No. 94-363. The Dischargers requested that Order No. 94-363 be revised to allow for a shorter storm water detention period after biosolids are applied.
5. The biosolids application sites are divided into several 20-acre application fields for monitoring and compliance purposes. Each field receives one application of biosolids per year in accordance with the agronomic needs of the crop to be grown. Supplemental fertilizers are not used. The amount of biosolids applied is determined for each field based on the crop to be grown and the plant available nitrogen (PAN) content of the biosolids.
6. Biosolids are delivered to the ranch sites in end-dump trucks, typically at solids contents of 20 to 30 percent. The trucks deliver their loads directly to the fields (there are no centralized staging

areas). The biosolids are then loaded from the ground into a tractor-mounted box-type manure spreader using a front-end loader, with typical application rates of 20 to 35 wet tons per acre.

7. According to the RWD, biosolids are delivered, unloaded, and applied to land within 24 hours of arrival at the site, and will be incorporated into the soil within 24 hours of application using contour tilling.
8. Biosolids are typically applied from April through November; however, the Discharger would also like the option to be able to apply biosolids during the winter. Each field is seeded, typically in the late fall, with winter barley or other crops such as pasture grass mix. According to the Western Fertilizer Handbook, the nitrogen uptake for barley is 160 pounds per acre per year. The fields are not irrigated.
9. Based on the 1998 Annual Report submitted by the Dischargers, post-application soil analytical data for Jess Ranch are summarized below.

| Constituent/Parameter               | No. of Samples | Minimum Result    | Maximum Result    | WDRs Limit for Groundwater Protection |
|-------------------------------------|----------------|-------------------|-------------------|---------------------------------------|
| pH, std. units                      | 35             | 5.38 <sup>1</sup> | 7.60 <sup>1</sup> | 6.5 (min.)                            |
| Cation exchange capacity, meq/100 g | 35             | 17.8              | 57.2              | NA                                    |
| Cadmium, mg/L <sup>2</sup>          | 35             | <0.002            | 0.0046            | 0.1                                   |
| Copper, mg/L <sup>2</sup>           | 35             | 0.037             | 0.42              | 20.0                                  |
| Lead, mg/L <sup>2</sup>             | 35             | <0.005            | 0.033             | 0.5                                   |
| Nickel, mg/L <sup>2</sup>           | 35             | 0.076             | 0.10              | 0.134                                 |
| Zinc, mg/L <sup>2</sup>             | 35             | 0.012             | 0.74              | 200.0                                 |

NA Not applicable

<sup>1</sup> Results not typical.

<sup>2</sup> Soluble concentration determined using the Waste Extraction Test with deionized water as the extractant.

Most of the samples exhibited a pH of greater than 6.5, and a cation exchange capacity greater than 30 meq/100g. Based on these data, typical biosolids applications have not caused exceedance of the soluble concentration limits prescribed in Order No. 94-363 to prevent groundwater degradation.

10. The 1998 Annual Report included the following data for calculated cumulative metals loadings at the Jess Ranch.

| Constituent             | Cumulative Loading<br>(lb/acre) |         | WDRs Limit <sup>1</sup> |
|-------------------------|---------------------------------|---------|-------------------------|
|                         | Minimum                         | Maximum |                         |
| Arsenic                 | <1                              | 2       | 36                      |
| Cadmium                 | <1                              | 3       | 34                      |
| Chromium <sup>2</sup>   | 1                               | 31      | 1,070                   |
| Copper                  | 18                              | 201     | 1,336                   |
| Lead                    | 2                               | 64      | 267                     |
| Mercury                 | <1                              | <1      | 15                      |
| Molybdenum <sup>2</sup> | <1                              | 3       | 16                      |
| Nickel                  | 2                               | 14      | 374                     |
| Selenium                | <1                              | <1      | 31                      |
| Zinc                    | 22                              | 326     | 2,494                   |

<sup>1</sup> Limits based on requirements of 40 CFR 503. Note, however, that the State Board's General Order for land application of biosolids requires that those limits be adjusted downward to account for naturally occurring metals in the soil so that metals from biosolids application combined with naturally occurring metals will not cause soil concentrations to exceed risk-based limits determined by the U.S. EPA.

<sup>2</sup> 40 CFR 503 no longer contains concentration or loading limits for chromium, and the limits for molybdenum have been suspended by U.S. EPA pending further review. Note, however, that the State Board's General Order for land application of biosolids imposes the original limits for molybdenum.

Based on the calculated cumulative metals loading after seven years of biosolids application (1992 through 1999), it appears that the lead and copper content of biosolids will determine the number of applications remaining before the cumulative loading limits are reached, and that the cumulative loading limit for lead may be reached within 22 years if biosolids are applied each year and metals concentrations are the same as in previous years.

### Compliance History

11. Order No. 94-363, originally issued to Future-Tech Environmental Services and the land owners, prohibited discharge of storm water and irrigation runoff from the fields for six months following application of biosolids. That Order also allowed biosolids to be stored on-site for up to 45 consecutive days, but required vadose zone monitoring beneath the biosolids storage facility.
12. During a routine facility inspection on 26 July 2000, staff observed that the existing runoff control and storm water detention basins were not designed to capture runoff from all of the permitted land application fields and did not appear large enough to contain all storm water for the required detention period. Additionally, there was no vadose zone monitoring system in operation at the biosolids storage area. The new facility operator (RPI/Biogro, a subsidiary of Waste Management, Inc.) stated that the storm water detention and vadose zone monitoring requirements were unnecessary and infeasible. Staff subsequently issued a Notice of Violation to the Dischargers

requiring that they either comply with the WDRs or apply for revised WDRs and justify the proposed changes.

13. In August 2000, Synagro West, Inc. purchased RPI/Biogro. Synagro's response to the NOV stated that the existing runoff controls were sufficient to protect surface water quality and that the Dischargers would cease use of the biosolids storage area in lieu of installing a vadose zone monitoring system. On 11 December 2000, staff reiterated that the existing runoff controls did not comply with the WDRs and informed the Dischargers that no further discharge would be approved until the deficiencies were corrected. Synagro agreed to cease land application, but requested that the WDRs not be rescinded.
14. In May 2004, the land owners and the former owner of Future-Tech Environmental Services (now the owner of Biosolids Recycling, Inc.) applied for an ownership change for Order No. 94-363, naming Biosolids Recycling, Inc. as the new facility operator. On 6 July 2004, staff formally informed the new operator of the previous enforcement action and requested that Biosolids Recycling, Inc. submit a detailed compliance plan before submitting any pre-application reports for staff's approval.
15. On 28 December 2004, the Dischargers submitted a RWD to apply for revised WDRs. Staff informed the Dischargers that processing the application would be delayed due to staffing constraints. Because of the anticipated shorter processing time, the Dischargers requested that staff consider the RWD as an application for coverage under State Water Resources Control Board (State Board) Order No. 2004-0012-DWQ, the General Waste Discharge Requirements for the Discharge of Biosolids to Land.
16. On 20 January 2005, staff received a proposed interim compliance plan from the Dischargers, who were seeking permission to apply biosolids before revised WDRs or coverage under the State Board's General Order were to be issued. The Dischargers proposed to apply biosolids only to portions of Jess Ranch that had adequate runoff controls and to pump the storm water detention ponds for field irrigation as needed to prevent releases of runoff from the site.
17. On 10 February 2005, staff issued a letter conditionally approving the interim compliance plan. In addition to the control proposed by the Dischargers, additional conditions included a) constructing runoff control berms between the proposed application areas and a seasonal drainage that traverses the Jess Ranch site, and b) limiting the application period to April through October 2005. The Dischargers later amended the interim compliance plan to eliminate application to areas that drain to the seasonal drainage course.
18. On 17 May 2005, staff approved the Dischargers' pre-application report (for 2005 only) on the condition that application be limited to areas that drain to detention ponds and to slopes no greater than those allowed in Order No. 94-363.

**Proposed Changes in the Discharge**

19. On 29 June 2005, staff informed the Dischargers that the RWD was inadequate as a Notice of Intent to apply for coverage under the State Board’s General Order for the following reasons:
  - a. The RWD did not demonstrate compliance with the slope restrictions of the General Order, which restrict applications to slopes of 25 percent or less;
  - b. The RWD did not demonstrate compliance with the setback requirements of the General Order; and
  - c. The RWD did not specify how the Dischargers would comply with the runoff control requirements of the General Order.
  
20. On 15 August 2005, the Dischargers submitted a revised RWD requesting individual WDRs for the land application sites. The RWD requested that Order No. 94-363 be revised to require only 30 days of storm water detention following biosolids application. The Dischargers proposed to continue to comply with:
  - a. The slope limitations of Order No. 94-363, which allow application to slopes of up to 28 degrees (i.e., 53 percent, or approximately 2H:1V); and
  - b. The setback requirements of Order No 94-363, which include a 100-foot setback from surface water drainages.

The August 2005 RWD proposed to allow biosolids applications to certain drainage areas during the rainy season (November through March), as summarized below. The drainage areas are depicted on Attachment B, which is attached hereto and made part of the Order by reference.

| <u>Site/Drainage Area ID</u> | <u>Proposed Application Period</u> |                     |
|------------------------------|------------------------------------|---------------------|
|                              | <u>Beginning Month</u>             | <u>Ending Month</u> |
| <u>Jess Ranch</u>            |                                    |                     |
| J-1                          | June                               | August              |
| J-1A <sup>1</sup>            | May                                | November            |
| J-2                          | May                                | September           |
| J-3                          | May                                | September           |
| J-4                          | May                                | October             |
| <b>J-5</b>                   | February                           | December            |
| <u>Marciel Ranch</u>         |                                    |                     |
| <b>M-1</b>                   | March                              | December            |
| <b>M-2</b>                   | January                            | December            |
| <b>M-3</b>                   | January                            | December            |
| M-4                          | May                                | October             |
| M-5                          | May                                | September           |
| M-6                          | May                                | September           |
| M-7                          | April                              | September           |

<sup>1</sup> The RWD did not define the location or boundaries of this drainage area.

According to the RWD, the areas proposed for winter application (J-5, M-1, M-2, and M-3) exhibit maximum slopes ranging from 17 percent (J-5) to 31 percent or greater (M-1, M-2, and M-3). Each of these areas reportedly has a storm water detention pond with sufficient capacity to contain storm water runoff for at least 30 days during an average precipitation year based on the average year monthly maximum precipitation total of 2.40 inches. Storm water detention is discussed further below.

Because biosolids cannot be applied and incorporated after a crop has been planted, areas that receive winter applications as proposed could not be planted until sometime during the rainy season. Because saturated soil and/or steep slopes may prevent site access for tilling and planting, areas that cannot be tilled and cropped will be vulnerable to erosion. Therefore, it is appropriate to restrict winter biosolids application to slopes that are less vulnerable to erosion (i.e., slopes of 25 percent or less).

21. The December 2004 RWD included an acceptable Spill Response and Traffic Plan to provide full containment of biosolids during transport, prevent spillage, and provide for spill response where appropriate.
22. The December 2004 RWD also included an Adverse Weather and Alternative Plan that specifies the procedures to be used when biosolids cannot be land applied during brief periods due to adverse weather. In general, the Dischargers propose to divert biosolids to a permitted landfill for disposal when they cannot be land applied. During periods of sustained high wind, the Dischargers propose to stage biosolids on the fields until the wind subsides to an acceptable level (which was not defined).
23. The August 2005 RWD included drainage calculations, a summary of historical storm water monitoring data, and an Erosion Control Plan that detailed proposed methods of erosion control for the sites. This information is discussed in the context of site-specific conditions below.

#### **Site-Specific Conditions**

24. The sites exhibit rolling hilly terrain with elevations ranging from 340 to 845 feet above mean sea level (MSL). Site drainage is generally northward towards Mountain House Creek, which flows along the northern site boundary and drains to Old River.
25. According to the RWD, the sites exhibit surface slopes of nine to fifteen percent along hilltops and ridgelines, and slopes of greater than 75 percent (1.3H:1V) on the hillsides.
26. Based on a technical report submitted by the Dischargers in March 1998, surface soils at the land application sites consist primarily of up to two feet of clayey loam and clay overlying Panoche Formation sandstone interbedded with shale or Neroly Formation gravelly sandstone. However, the August 2005 RWD describes the soil mantle overlying the bedrock as up to 48 inches thick. Several weathered rock outcroppings are present at the site.

27. The August 2005 RWD states that shallow soils at the sites are neutral to slightly acid, and that the soil pH tends to increase with depth.
28. The application sites are not within the 100-year floodplain.
29. The average annual precipitation in the vicinity of the facility is approximately 13 inches. Based on the period of record for the Altamont Pass weather station, the peak precipitation month is typically January, with a monthly precipitation total of 2.40 inches.
30. The sites are in Altamont Pass, which is subject to moderate, sustained winds. Several commercial wind farms are located around the sites.
31. The reference evapotranspiration rate (ET<sub>0</sub>) for the area is approximately 57 inches per year.
32. The Dischargers' Erosion Control Plan states that runoff from the sites and the potential for erosion from bare soil is moderate. The plan proposed to use contour tilling to control erosion, stating that it is effective on slopes of up to 35 percent, but it did not address erosion control for steeper slopes. A winter crop (typically planted in October) would provide further erosion protection, but the RWD did not demonstrate that cropping would be sufficient to prevent erosion on slopes steeper than 35 percent.
33. The operator has stated that certain slopes at the sites are too steep to allow equipment access for land application, tilling, and cropping, but did not define the maximum practical slope for such activities. Although limited site inspections have not revealed evidence of erosion problems associated with cropping practices at the sites, it is unclear whether biosolids can be applied and incorporated on slopes greater than 35 percent without causing erosion. Therefore, it is appropriate to restrict biosolids application to slopes that are shallow enough to provide equipment access for contour tilling and to require that the Dischargers define those areas where site conditions effectively prohibit contour tilling or other effective erosion control.
34. The August 2005 RWD defined several discrete drainage areas for the ranch sites, as shown on Attachment B. Each ranch site has several storm water detention basins to control discharge of storm water to Mountain House Creek. The following table summarizes the drainage calculations and storm water detention capacity at the sites as presented in the RWD.

| Site/Detention<br>Pond ID | Drainage<br>Area<br>(acres) | Peak Month<br>Runoff<br>(acre-feet) <sup>1</sup> | Six-Month<br>Runoff Total<br>(acre-feet) <sup>2</sup> | Pond Capacity<br>(acre-feet) |
|---------------------------|-----------------------------|--|---|------------------------------|
| <u>Jess Ranch</u>         |                             |  |   |                              |
| J-1                       | 13.6                        | <b>0.60</b>                                      | <b>2.40</b>   | 0.50                         |
| J-1A                      | 39.5                        | 1.74   | 6.97  | 7.3                          |
| J-2                       | 55.6                        | <b>2.45</b>                                      | <b>9.81</b>   | 2.15                         |
| J-3                       | 51.7                        | <b>2.27</b>                                      | <b>9.11</b>   | 2.17                         |
| J-4                       | 19.5                        | 0.86   | 3.44  | 4.13                         |

| Site/Detention<br>Pond ID | Drainage<br>Area<br>(acres) | Peak Month<br>Runoff<br>(acre-feet) <sup>1</sup> | Six-Month<br>Runoff Total<br>(acre-feet) <sup>2</sup> | Pond Capacity<br>(acre-feet) |
|---------------------------|-----------------------------|--|---|------------------------------|
| <b>J-5</b>                | 86.3                        | 3.80   | 15.23   | 28.33                        |
| <u>Marciel Ranch</u>      |                             |  |   |                              |
| <b>M-1</b>                | 51.7                        | 2.27   | 9.11  | 18.4                         |
| <b>M-2</b>                | 32.6                        | 1.43   | 5.75  | >20                          |
| <b>M-3</b>                | 17.5                        | 0.77   | 3.08  | >20                          |
| M-4                       | 89.1                        | 3.92   | <b>15.71</b>  | 9.2                          |
| M-5                       | 148.5                       | <b>6.53</b>                                      | <b>26.19</b>  | 2.3                          |
| M-6                       | 54.5                        | <b>2.40</b>                                      | <b>9.62</b>   | 0                            |
| M-7                       | 25.3                        | <b>1.11</b>                                      | <b>4.46</b>   | 0                            |

<sup>1</sup> Based on average year precipitation; peak precipitation occurs in January.

<sup>2</sup> Based on average year precipitation totals for October through March.

As indicated above, the Dischargers acknowledge that six of the drainage areas (J-1, J-2, J-3, M-5, M-6, and M-7) do not have sufficient storm water detention capacity to provide thirty days of retention during a normal precipitation year. Neither Area J1-A nor its retention pond was depicted or defined on any map. Biosolids Recycling, Inc. states that the runoff calculations are conservative and that the detention ponds have never overflowed. However, the RWD did not:

- a. Provide a map showing the locations of the detention ponds at Marciel Ranch and portions of Jess Ranch; or
- b. Document the drawings, methods, and calculations used to determine the capacity of the detention ponds.

Therefore, it is appropriate to require that the Dischargers provide complete information to demonstrate storm water detention facilities sufficient to ensure compliance with this Order have been constructed prior to any further biosolids application.

35. The August 2005 RWD states that runoff control berms are needed to direct runoff from the application areas to the detention ponds and to prevent runoff from entering the three ephemeral streams that transect the sites. The RWD proposed to reconstruct the berms and detention ponds as needed prior to 15 October each year. Based on staff's December 2005 site inspection, no such berms were present.
36. The Dischargers performed storm water quality monitoring during years when biosolids were applied. Per Monitoring and Reporting Program No. 94-363, the Dischargers were required to analyze one sample of impounded storm water twice yearly. Between 1992 and 1998, a total of sixteen storm water samples were analyzed: five samples from off-site runoff (background) and eleven samples from on-site storm water detention ponds. Most of the samples were obtained between January and April. The analytical results are summarized below.

| Parameter                               | Analytical Result |         |       |                |         |             |
|---|-------------------|---------|-------|----------------|---------|-------------|
|   | Background        |         |       | Detention Pond |         |             |
|   | Minimum           | Maximum | Mean  | Minimum        | Maximum | Mean        |
| Electrical conductivity,<br>umhos/cm    | 1,000             | 6,320   | 3,378 | 97             | 4,870   | 1,903       |
| pH, standard units                      | 7.65              | 8.77    | 8.3   | 7.31           | 9.04    | 8.1         |
| BOD, mg/L                               | 3.3               | 6.9     | 4.9   | 2.6            | 54      | <b>13</b>   |
| Total coliform organisms,<br>MPN/100 mL | 50                | 1,700   | 523   | 14             | 22,000  | 3,279       |
| Fecal coliform organisms,<br>MPN/100 mL | 17                | 700     | 234   | 11             | 13,000  | 2,124       |
| Nitrate as NO <sub>3</sub> , mg/L       | 2.81              | 37      | 12.7  | 1              | 190     | <b>63.9</b> |
| Cadmium, ug/L                           | <0.5              | <10     | NA    | <0.5           | <10     | NA          |
| Copper, ug/L                            | 13                | 20      | 17    | 2              | 98      | <b>39</b>   |
| Lead, ug/L                              | 6                 | 6       | 6     | 4              | 60      | <b>20</b>   |
| Nickel, ug/L                            | 10                | 20      | 14    | 10             | 120     | <b>31</b>   |
| Zinc, ug/L                              | 5                 | 130     | 48    | 10             | 590     | <b>138</b>  |
| Total organic carbon, mg/L              | 4.1               | 27      | 13.2  | 6.9            | 41      | <b>20.9</b> |

The data indicate that storm water originating off-site is typically significantly more saline than on-site runoff contained in the detention ponds. However, the on-site runoff typically contained concentrations of nitrate and metals significantly greater than the off-site samples. Because the ranch sites are used for cattle grazing, the high bacterial counts alone do not provide a good indicator of storm water contamination from biosolids application. The nitrogen and metals results indicate that storm water runoff from the sites contains waste constituents that may pose a threat to surface water quality. It is possible that dilution with storm water from upgradient sources will be sufficient to prevent degradation of surface water quality. It is appropriate to reduce the required storm water detention period to 30 days as requested, as long as the Dischargers demonstrate through surface water monitoring that surface water quality will not be degraded. It is also appropriate to require that the Dischargers expand the storm water detention ponds as needed to provide capacity for 30 days of runoff.

### Groundwater Considerations

37. According to the 1998 technical report, the Panoche and Neroly formations are considered unlikely to yield sufficient quantity and quality of water for most uses. However, the report stated that there may be perched zones within the fractured rock of the Neroly Formation, and that the Panoche Formation may also yield groundwater.

38. The Dischargers have not completed a site-specific subsurface investigation to assess the occurrence and chemical quality of groundwater beneath the facility site. However, based on recent groundwater monitoring data for a gasoline service station formerly located at the Interstate 580 Grant Line Road interchange, shallow groundwater is likely to be present at an elevation of 300 feet MSL (approximately 20 to 30 feet below the ground surface) at the northeastern corner of Jess Ranch.
39. According to recent groundwater monitoring reports for the former gas station site, the groundwater gradient is generally towards the north, flowing downhill towards Interstate 580. Historical analytical data for wells upgradient of the former fuel tanks (cross gradient of Jess Ranch) are summarized below.

| Parameter                         | Range of Results |                |              |
|-----------------------------------|------------------|----------------|--------------|
|                                   | MW-4             | MW-7           | MW-8         |
| Electrical Conductivity, mhos/cm  | 1,039 to 1,500   | 1,136 to 6,000 | 375 to 4,400 |
| pH, standard units                | 6.24 to 6.92     | 7.3 to 7.93    | 7.08 to 7.84 |
| Alkalinity, mg/L                  | 400 to 550       | 300 to 350     | 100 to 200   |
| Nitrate as NO <sub>3</sub> , mg/L | 17 to 86         | 45 to 99       | 35 to 50     |
| Sulfate, mg/L                     | 30 to 68         | 85 to 100      | 16 to 24     |

These data indicate that local groundwater quality is moderately to extremely saline with nitrate concentrations that frequently exceed the applicable water quality limit of 45 mg/L. Presumably, the nitrate results from ongoing use of the adjacent land as cattle pasture. Due to the possibility of shallow groundwater at the sites and evidence of existing nitrate impacts to groundwater quality, it is appropriate to require that the Dischargers evaluate the depth to groundwater near the down slope site boundary during late spring when the water table is expected to be at its highest point. If groundwater is found at less than 25 feet below ground surface, it is appropriate to require groundwater monitoring and definition of background groundwater quality to ensure compliance with the groundwater limitations of this Order. If groundwater monitoring is necessary, the Discharger may either propose to install wells in the areas with the highest potential for groundwater impact or may propose to install wells throughout the site.

### **Special Considerations for Biosolids**

40. Biosolids have the following characteristics which can cause water quality and public health problems if biosolids application is not properly managed:
- a. Pathogens can be present. Unless biosolids are treated or disinfected to destroy pathogens, significant concentrations of bacteria, viruses, and parasites can remain. Public health problems can be prevented with public access control and crop use restrictions. Additionally,

buffer zones around water supply wells, surface water drainage courses, and public areas are appropriate to prevent transmission of pathogens to the public.

- b. Heavy metals will be present. Over-application of heavy metals can cause groundwater degradation, plant toxicity to plants and/or soil microorganisms, or plant tissue buildup (which may lead to toxicity/adverse effects to animals). Only some of the metals commonly found in biosolids are known to cause water quality or public health problems. It is appropriate to establish application rates for those metals to prevent those problems.
  - c. Biosolids are a significant source of nitrogen. Nitrogen can be over-applied, allowing a buildup of nitrogen in soils. Excess nitrogen will eventually be converted to nitrate, which can migrate to groundwater, causing degradation and/or pollution. Therefore, it is appropriate to require that biosolids be applied at agronomic rates considering the needs of the crops to be grown and residual nitrogen from previous biosolids applications.
  - d. Biosolids are a significant source of decomposable organic matter. Excessive application can create acidic soil conditions, which may be detrimental to crops and may cause groundwater degradation. If the buffering capacity of the soil is exceeded and soil pH decreases below 5, metals (both naturally occurring and those in the biosolids) may dissolve and degrade underlying groundwater. Reducing conditions caused by oxidation of organic matter in the biosolids can also liberate iron and manganese from soil. It is therefore appropriate to require soil monitoring and pH correction as needed. The RWD included a soil pH management program that should be adequate to prevent such degradation.
  - e. Biosolids land application can create odor and insect nuisances if the biosolids have not been adequately stabilized or if wet biosolids are allowed to remain on the ground surface. Compliance with State and federal standards for stabilization of the biosolids will minimize the potential for odors and insect nuisances, and proper management at the application site will prevent odor or insect nuisances. Therefore, it is appropriate to impose requirements that ensure timely incorporation into the soil and buffer zones around residences and public areas.
  - f. Discharge of organic matter, metals, and pathogens to surface waters can affect water quality. It is therefore appropriate to impose requirements to control field runoff after biosolids application.
41. Most of the nitrogen present in biosolids is in organic form, which must be mineralized to ammonia and then nitrate, which is the form of nitrogen that plants utilize. Organic nitrogen from biosolids typically does not completely mineralize during the first year after it is applied, and some may remain present in the soil as humus indefinitely. Therefore, it is common for land applications of biosolids to exceed the total nitrogen requirements of the crop in order to ensure that sufficient plant available nitrogen (PAN) is applied each year. In order to prevent nitrogen over application, biosolids application rates should be based on consideration of the nitrogen content of the biosolids to be applied, nitrogen mineralization from previous years' biosolids applications, and all supplemental nutrient sources (including livestock waste). Appendix E of the US Environmental Protection Agency's *Guide for [Biosolids] Land Appliers* (EPA/831-B-93-002b) describes appropriate procedures for determining PAN for fresh biosolids based on the total nitrogen content and residual PAN from previous years' applications. It is therefore appropriate to

require that the Dischargers calculate PAN using the procedure, volatilization factors, and mineralization rates described that document.

### **Basin Plan, Beneficial Uses, and Regulatory Considerations**

42. The Water Quality Control Plan for the Sacramento River and San Joaquin River Basins, Fourth Edition, (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 Board. Pursuant to Section 13263(a) of the California Water Code, waste discharge requirements must implement the Basin Plan.
43. Surface water drainage is to Mountain House Creek, which is tributary to Old River in the Sacramento San Joaquin Delta. The beneficial uses of the Sacramento San Joaquin Delta are municipal and domestic supply; agricultural supply; industrial supply, water contact recreation; non-contact water recreation; warm freshwater habitat; cold freshwater habitat; migration of aquatic organisms; spawning reproduction and/or early development; wildlife habitat; and navigation.
44. The beneficial uses of underlying groundwater are municipal and domestic water supply, agricultural supply, industrial service supply, and industrial process supply.
45. State 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 cause exceedance of one or more water quality objectives; and
  - d. The Discharger employs best practicable treatment and control to minimize degradation.

The Dischargers have not provided the required demonstration pursuant to State Board Resolution No. 68-16 to be allowed to cause groundwater degradation. Therefore, none is authorized by this Order.

46. The discharge is exempt from the requirements of *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., (hereafter Title 27). The exemption pursuant to Section 20090(b), is based on the following:
  - a. The Regional Board is issuing waste discharge requirements,
  - b. The discharge complies with the Basin Plan, and
  - c. The biosolids do not need to be managed according to Title 22 CCR, Division 4.5, and Chapter 11, as a hazardous waste.

The exemption does not apply to storage of biosolids for periods exceeding seven calendar days. If the Dischargers elect to operate a long-term biosolids storage facility on-site, that facility will require a separate Order pursuant to Title 27, CCR.

47. The United States Environmental Protection Agency (USEPA) has promulgated biosolids reuse regulations in 40 CFR 503 that establish criteria for water quality protection, limits for heavy metals loading rates, and stabilization and disinfection criteria. The Regional Board is using 40 CFR 503 as a guideline for developing this Order. However, the Regional Board is not the implementing authority for 40 CFR 503, and the Dischargers and generators of biosolids that are land applied pursuant to this Order may have separate and/or additional compliance, reporting, and permitting responsibilities to the USEPA that are not addressed by this Order.
48. The State Water Resources Control Board adopted Water Quality Order No. 97-03-DWQ (National Pollutant Discharge Elimination System, General Permit No. CAS 000001, Waste Discharge Requirements for Discharges of Storm Water Associated with Industrial Activities) to regulate discharges of storm water from industrial sites to surface water. The Dischargers are not required to obtain coverage under this permit. However, it is appropriate for this Order to incorporate requirements to prevent discharge of contaminated storm water to surface water.
49. 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 the level of management required to assure best practicable treatment and control, preclude conditions that threaten degradation or nuisance, and protect groundwater quality will be sufficient reason to enforce this Order, modify it, or revoke it and prohibit further discharge. Therefore it appropriate to prescribe limits for waste constituent loading and pH, but it remains the responsibility of the Dischargers to assure that its waste loading practices do not degrade groundwater or create a condition of pollution or nuisance.
50. 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. In requiring those reports, the regional board shall provide the person with a written explanation with regard to the need for the reports, and shall identify the evidence that supports requiring that person to provide the reports."

The monitoring and reporting program required by this Order and the attached Monitoring and Reporting Program No. \_\_\_ are necessary to assure compliance with these waste discharge requirements. The Dischargers operate the facility that receives the waste subject to this Order.

51. The action to update waste discharge requirements for this existing facility is exempt from the provisions of the California Environmental Quality (CEQA), in accordance with Title 14 CCR, Section 15301.
52. The Alameda County Planning Department adopted a Negative Declaration for Jess Ranch (5 February 1992) and Marciel Ranch (15 September 1993) in accordance with CEQA. The Dischargers have not proposed any changes to the discharge that would trigger subsequent review pursuant to CEQA, and the project(s), when conducted in compliance with this Order, should not cause adverse environmental impacts.

### **Public Notice**

53. All the above and the supplemental information and details in the attached Information Sheet, which is incorporated by reference herein, were considered in establishing the following conditions of discharge.
54. The Dischargers 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.
55. 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, Order No. 94-363 is hereby rescinded, and Biosolids Recycling, Inc., Joseph and Connie Jess, and Paul and Sally Marciel and their 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. **Effective immediately**, any application of biosolids is prohibited unless and until the Executive Officer approves in writing the technical report required pursuant to Provision G.1.a.
2. Land application of biosolids to areas other than those described in Finding No. 2 and Attachments A and B (as modified by the following Prohibitions and Specifications) is prohibited.

3. Unless expressly approved in writing by the Executive Officer, land application of biosolids to areas where the slope exceeds 35 percent is prohibited.
4. Application of biosolids to areas where the slope exceeds 25 percent is prohibited between 1 November and 30 April.
5. Land application of biosolids to any area without adequate runoff control and/or 30-days of storm water detention capacity (as specified in the General Discharge Specifications) is prohibited.
6. Discharge of biosolids except as allowed for authorized biosolids storage, staging, and application is prohibited.
7. Discharge of wastes to surface waters or surface water drainage courses is prohibited.
8. Application of biosolids to saturated ground or during rainfall events is prohibited.
9. Discharge of waste classified as hazardous, as defined in Sections 2521(a) of Title 23, CCR, Division 3, Chapter 15, Section 2510, et seq., (hereafter Chapter 15), or 'designated', as defined in Section 13173 of the California Water Code, is prohibited.
10. Application of any material that results in a violation of the Safe Drinking Water and Toxic Enforcement Act (Health and Safety Code section 25249.5) is prohibited.
11. Application of Class B biosolids exhibiting a moisture content less than 50 percent is prohibited.
12. Application of biosolids at rates in excess of the nitrogen requirements of the vegetation or at rates that would degrade groundwater is prohibited.
13. Discharge of biosolids with pollutant concentrations greater than those shown below is prohibited.

| <u>Constituent</u> | <u>Ceiling Concentration<br/>(mg/kg dry weight)</u> |
|--------------------|---|
| Arsenic            | 75  |
| Cadmium            | 85  |
| Copper             | 4,300   |
| Lead               | 840   |
| Mercury            | 57  |
| Molybdenum         | 75  |
| Nickel             | 420   |
| Selenium           | 100   |
| Zinc               | 7,500   |

**B. General Discharge Specifications:**

1. Objectionable odors originating from the staging, storage, or application of biosolids shall not be perceivable beyond the respective property limits.
2. All staging, storage, and biosolids application areas shall be designed, constructed, operated, and maintained to prevent inundation or washout due to floods with a 100-year return frequency.
3. All storm water detention ponds shall be designed to provide a retention volume equivalent to the runoff total for the peak precipitation month of the average precipitation year plus two feet of freeboard (i.e., runoff generated by 2.40 inches of precipitation plus two feet of freeboard).
4. All storm water detention ponds shall be empty by 1 October each year. After that date, storm water runoff that accumulates in the ponds shall be removed as necessary until the cumulative precipitation to date has equaled or exceeded 2.40 inches. The storm water shall be land applied within the designated land application areas and shall not be allowed to run off or otherwise enter surface water drainage courses.
5. Once the cumulative precipitation to date has equaled or exceeded 2.40 inches, storm water runoff from subsequent precipitation events may be released to surface water drainage courses directly or via flow through the ponds.
6. If temporary berms will be used to direct or contain runoff during the rainy season until the cumulative precipitation has equaled or exceeded 2.40 inches, then the berms shall be reconstructed by 30 June each year.
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 storage, transport, or application of biosolids shall not cause a condition of pollution or nuisance as defined by the California Water Code, Section 13050.
9. All biosolids shall comply with the applicable pathogen reduction standards listed in 40 CFR Part 503.32.
10. All biosolids shall comply with one of the applicable vector attraction reduction requirements specified in 40 CFR Part 503.33.
11. Biosolids shall not be applied to soil with a pH of less than 6.5.
12. Cumulative metals loading rates shall not exceed the risk-based cumulative loading rates (adjusted to account for background metals concentrations) as defined below:  
BC= CR- 1.8(BS)

Where:

BC = Background-Adjusted Cumulative Loading Rate (lbs/ac)

CR = 40 CFR Part 503 Cumulative Pollutant Loading Rate (lb/ac)

BS = Site Background Soil Concentration (mg/Kg)

And where the values for CR for each metal are given below:

| <u>Pollutant</u> | <u>Cumulative Pollutant<br/>Loading Rate (lb/ac)</u> |
|------------------|--|
| Arsenic          | 36   |
| Cadmium          | 34   |
| Copper           | 1,336  |
| Lead             | 267  |
| Mercury          | 15   |
| Molybdenum       | 16   |
| Nickel           | 374  |
| Selenium         | 89   |
| Zinc             | 2,494  |

13. Biosolids with a moisture content less than 75 percent shall not be applied during periods when the surface wind speed exceed 25 miles per hour.
14. Biosolids shall be incorporated into the soil within 24 hours after application. If the vector attraction reduction option defined in 40 CFR 503.33(b)(10)(i) is selected, biosolids must be incorporated into the ground within six hours of application.

### **C. Additional Discharge Specifications for Class B Biosolids**

1. After application of biosolids, the Dischargers shall ensure the following:
  - a. For at least 30 days, food, feed, and fiber crops are not harvested.
  - b. For at least 60 days domestic animals shall not be grazed if average daily (daytime) air temperatures exceed 50°F.
  - c. For at least 90 days domestic animals shall not be grazed if average daily (daytime) air temperatures are less than 50°F.
  - d. For at least 12 months:
    - i Public access to the site is restricted for sites with a high potential for public exposure;
    - ii Turf is not to be harvested if the harvested turf is placed on land with a high potential for contact by the public as defined in 40 CFR Part 503.11; and

- iii Grazing of milking animals used for producing unpasteurized milk for human consumption is prevented if the field is used as pasture.
- e. For at least 14 months:
  - i Food crops with harvested parts that touch the biosolids/soil mixture and are totally above the land surface are not harvested.

**D. Biosolids Staging, Storage and Transportation Specifications**

Biosolids shall be considered to be “stored” if they are placed on the ground or in non-mobile containers (i.e., not in a truck or trailer) at the application site or an intermediate storage location away from the generator/processing for more than 48 hours. Biosolids shall be considered to be “staged” if placed on the ground for brief periods solely to facilitate transfer of the biosolids between transportation and application vehicles.

1. Biosolids shall not be stored directly on the ground at any location for more than seven consecutive days.
2. Biosolids staged or stored on-site for more than 24 hours shall be covered.
3. Biosolids containing free liquids shall not be placed on the ground prior to application.
4. Areas used for short-term storage of Class B biosolids shall not be accessible to the public.
5. Biosolids storage facilities used for less than seven consecutive days between October 1 and April 30 shall be designed and maintained to prevent washout or inundation from a storm or flood with a return frequency of 100 years.
6. Biosolids storage facilities used between October 1 and April 30 shall be designed and maintained to contain all storm water generated during the 10-year, 24-hour storm event.
7. Biosolids storage facilities shall be designed, maintained, and operated to minimize erosion and leachate generation.
8. The Dischargers shall operate and maintain any biosolids storage areas in accordance with an approved biosolids storage plan.
9. All biosolids shall be transported in covered vehicles capable of containing the designated load.
10. All biosolids capable of generating free liquids shall be transported in leak proof vehicles.
11. Each biosolids transport driver shall be trained as to the nature of its load and the proper response to accidents or spill events and shall carry a copy of an approved spill response plan.

### **E. Land Application Area Specifications**

1. Biosolids may be applied to any area within the designated land application areas where slopes exceed 10 percent only if all of the following conditions are met:
  - a. The soil depth is sufficient to support the crop;
  - b. The slope will allow safe operation of spreading and tilling equipment; and
  - c. The slope can be tilled, planted, and grazed without causing or exacerbating soil erosion.
  
2. Biosolids staging and application areas shall be at least:
  - a. 10 feet from property lines;
  - b. 500 feet from domestic water supply wells;
  - c. 100 feet from non-domestic water supply wells;
  - d. 50 feet from public roads and occupied onsite residences;
  - e. 100 feet from the ordinary high water line of surface waters and natural or man-made drainage courses, including wetlands and vernal pools; and
  - f. 500 feet from occupied non-agricultural buildings and off-site residences unless the property owner agrees in writing to a reduced setback distance. In no case shall the setback be less than 100 feet.
  
3. The Dischargers shall comply with the following restrictions;
  - a. Public access to the application fields shall be prevented for at least 12 months after biosolids application;
  - b. Grazing of animals whose products are for human consumption shall be prevented for at least one month after biosolids application;
  - c. Grazing of milking animals shall be prevented for at least 12 months after biosolids application; and
  - d. Planting of unprocessed food crops shall be prevented for at least 36 months after biosolids application.
  
4. Each field that receives biosolids shall be planted with a crop such that the crop can reasonably be expected to germinate and grow within eight months of biosolids application.

### **F. Groundwater Limitations:**

1. The discharge shall not cause underlying groundwater to contain waste constituents in concentrations statistically greater than natural background water 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. At least **30 days prior to any planned biosolids application**, the Dischargers shall submit an *Erosion and Runoff Control Compliance Report* that demonstrates that all land application areas have fully functional runoff control systems that comply with the requirements of this Order. The report shall provide the following:
    - i. Complete topographic mapping of all drainage areas, drainage courses, surface waters, storm water detention ponds, areas where slopes exceed 35 percent, and runoff control berms present at the sites. All of these features shall be clearly shown on a single map.
    - ii. Scaled drawings of each runoff detention pond and engineering calculations demonstrating the storage capacity of each pond at two feet of freeboard. Such drawings shall be prepared and signed by a licensed land surveyor.
    - iii. Runoff calculations that demonstrate sufficient runoff detention capacity to ensure compliance with the requirements of this Order.
    - iv. If approval of application to slopes greater than 35 percent is requested, a supplemental erosion control plan that specifies the maximum practical slope for contour tilling and crop planting equipment operation under both wet and dry soil conditions, as well as supplemental erosion control measures as needed.

If desired, the report can be submitted in discrete phases, with each phase consisting of one or more of the drainage areas where the necessary improvements have been completed.

- b. By **30 October 2006**, the Dischargers shall submit a *Preliminary Groundwater Depth Assessment Workplan*. The workplan shall describe the proposed installation of a single soil boring at or near the lowest point of the land application areas to assess whether shallow groundwater is, or may be seasonally, present within the land application areas at depths of 25 feet or less. The workplan shall be consistent with, and include the items listed in, the first section of Attachment C, which is attached hereto and made part of this Order by reference.
- c. By **30 June 2007**, the Dischargers shall submit a *Preliminary Groundwater Depth Assessment Report* that describes completion of the soil boring and contains the items found in the second section of Attachment C. The report shall document that the boring was completed between March and June 2007.
- d. If the report required pursuant to Provision G.1.c shows that groundwater is or may be seasonally present at a depth of less than 25 feet, by **30 July 2007**, the Dischargers shall submit a *Monitoring Well Installation Workplan*. The workplan shall describe the proposed installation of at least four groundwater monitoring wells sufficient to characterize

groundwater gradient and groundwater quality upgradient and down gradient of (a) either the entire land application area, or (b) selected areas that are believed to be most susceptible to groundwater impacts from the application of biosolids. Monitoring wells shall be constructed to yield representative samples from the uppermost layer of the uppermost aquifer and to comply with applicable well standards. The workplan shall be consistent with, and include the items listed in, the first section of Attachment D, which is attached hereto and made part of this Order by reference.

- e. If the report required pursuant to Provision G.1.c shows that groundwater is or may be seasonally present at a depth of less than 25 feet, by **30 December 2007**, the Dischargers shall submit a *Monitoring Well Installation Report* that describes the installation of groundwater monitoring wells and contains the items found in the second and third sections of Attachment D. In accordance with the Monitoring and Reporting Program, groundwater monitoring shall begin with the fourth quarter of 2007.
  - f. If the report required pursuant to Provision G.1.c shows that groundwater is or may be seasonally present at a depth of less than 25 feet, by **30 January 2010**, the Dischargers shall submit a *Background Groundwater Quality Study Report*. For each groundwater monitoring parameter/constituent identified in the MRP, the report shall present a summary of all monitoring data and calculation of the concentration in background monitoring well(s). Determination of background quality shall be made using the methods described in Title 27, Section 20415(e)(10), and shall be based on data from at least 8 consecutive quarterly (or more frequent) groundwater monitoring events. For each monitoring parameter/constituent, the report shall compare the measured concentration in each compliance monitoring well with the proposed background concentration.
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 Dischargers shall comply with Monitoring and Reporting Program No. \_\_\_\_, which is a part of this Order, and any revisions thereto as ordered by the Executive Officer.
  4. The Dischargers 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. At least 90 days prior to termination or expiration of any lease, contract, or agreement involving the land application areas that is used to justify the capacity authorized herein and assure compliance with this Order, the Dischargers shall notify the Regional Board in writing of the situation and of what measures have been taken or are being taken to assure full compliance with this Order.
6. The Dischargers shall submit to the Regional 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 reported, then the Dischargers shall state the reasons for noncompliance and shall provide a schedule to come into compliance.
7. The Dischargers shall report promptly to the Regional Board any material change or proposed change in the character, location, or volume of the discharge.
8. In the event of any change in control or ownership of land or waste discharge facilities presently owned or controlled by the Dischargers, then the Dischargers shall notify the succeeding owner or operator of the existence of this Order by letter, a copy of which shall be forwarded to this office.
9. The Dischargers 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 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 each land application property shall be familiar with its contents.
11. The Regional Board will review this Order periodically and may 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 \_\_\_\_\_.

---

PAMELA C. CREEDON, Executive Officer