Chapter 2. Program Description

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This chapter provides a description of the SWRCB's proposed GO for regulation of land application of biosolids. It also provides the reader with the setting from which the GO has been developed. The GO objectives and program description are preceded by background information on current biosolids land application in California and the regulatory framework for this activity. The full text of the proposed GO is contained in Appendix A.

Background on Biosolids Generation, Disposal, and Reuse

Existing and Projected Biosolids Land Application in California

The methods available for biosolids management, and particularly land application of biosolids, are largely determined by the quality of the generated product. Sewage sludges removed in municipal wastewater treatment plants can be treated to produce biosolids of sufficient quality for use as soil amendments or can be disposed of. The three primary methods for reuse and disposal of biosolids are land application, surface disposal in a landfill, and incineration. This section describes the existing quantity of biosolids generated at municipal POTWs in California and the distribution of those biosolids to different reuse and disposal options. The projected quantity and distribution of biosolids are discussed with respect to a long-term planning horizon suitable for evaluation in this program EIR.

Current Biosolids Activity in California

Typical Biosolids Treatment. The quantity of biosolids generated at a municipal POTW depends on the specific processes for waste treatment and solids thickening that are used and the volume of wastewater received. The water content and appearance of the biosolids can differ depending on the ultimate disposal or reuse option used. Figure 2-1 shows treatment processes used to treat sewage sludge to produce biosolids at a POTW. Biosolids are separated from the liquid fraction of the waste stream at a typical POTW by primary and secondary clarification following waste oxidation processes. Following clarification, biosolids are commonly stabilized by anaerobic digestion, aerobic digestion, or pre-dewatering lime stabilization to reduce the level of pathogens and attraction to disease vectors such as flies, rodents, and mosquitos. Once stabilized, the moisture level of the biosolids may be reduced by mechanical filter

presses or centrifuges, gravity dewatering, heat treatment, solar drying, or long-term lagoon storage. After this initial treatment, biosolids can be disposed of in landfills. If pathogen levels and vector attraction have been sufficiently reduced following stabilization and drying, biosolids may then be used as daily cover at landfills; incinerated; or applied in bulk for certain types of agriculture, silviculture, or land reclamation. Alternatively, additional biosolids treatment may be employed (e.g., composting, lime stabilization, heat treatment, and thermophilic digestion) to further reduce pathogen levels and vector attraction. This additional treatment allows for more limited horticultural uses, such as bulk and bagged sales to the public as a garden soil amendment, bulk land application to public areas (e.g., golf courses and parks), and land application for certain agricultural crops.

Quantity of Biosolids Generated. The California Association of Sanitation Agencies (CASA), a nonprofit organization of municipal utilities, conducted statewide surveys in 1988, 1991, 1999 and 2001 to estimate the quantity of biosolids currently generated and the uses of those biosolids (California Association of Sanitation Agencies 1991, 1999, 2001). A portion of the large increase in dry TPD between the 1998 and 2001 surveys may be attributed to a larger survey sample of POTWs and higher rate of response to the survey. The 1988 and 1991 CASA survey results are derived from a database of 120 POTWs in California. CASA received responses from 86% of the POTWs in the 1988 survey and received updated responses from 45% of the POTWs in 1991. The 2001 CASA survey results are derived from a database of 197 POTWs, and the response rate is approximately 97% of the total. If complete information was not submitted with the survey response forms, CASA did not include the results in the summary analyses and quantitative estimates of biosolids management practices.

Based on the positive responses, CASA concluded that daily biosolids generation was 1,025 dry tons per day (TPD) in 1988; 1,610 dry TPD in 1991; 1,842 dry TPD in 1998; and 5,884 dry TPD in 2001. More than 70% of this material is generated at 10 POTWs that have daily wastewater flows in excess of 50 million gallons per day (mgd). Figure 2-2 shows the regional distribution of biosolids production within each RWQCB region, which is generally similar in all the surveys. As shown in Figure 2-2, the Los Angeles region generates the greatest percentage (nearly 40% in 1998) of biosolids among the nine RWQCB areas, followed in order by the Central Valley, San Francisco, Santa Ana, and San Diego regions.

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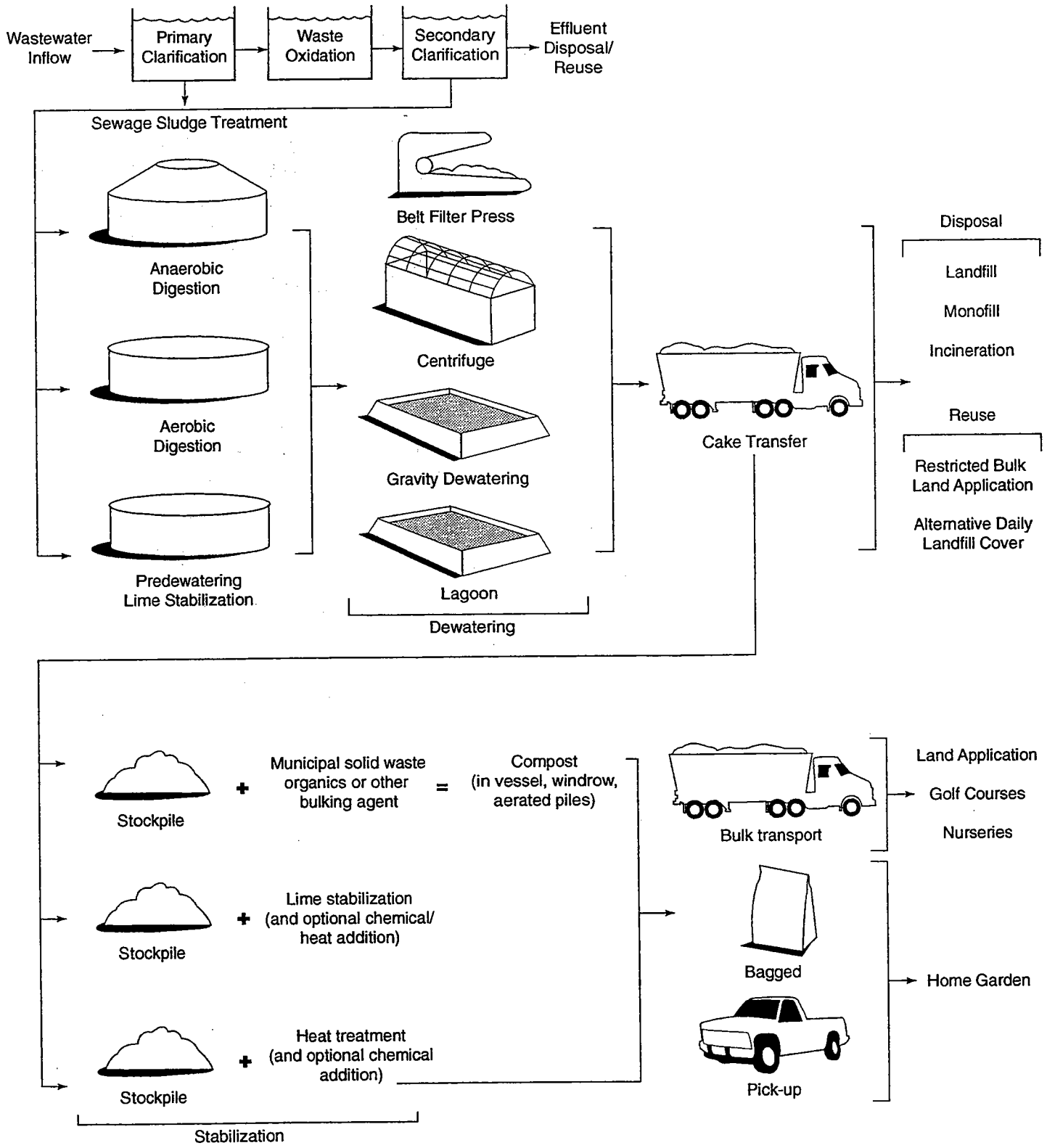

SOURCE:
Modified from Carollo Engineers 1997.

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Figure 2-1
Typical Biosolids Management Practices

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Disposal and Reuse Methods. Biosolids reuse and disposal options as a percentage of total biosolids generated in California are shown in Figure 2-2. The 1988 estimates indicated that approximately 60% of the biosolids generated in California were disposed of in landfills; the percentage decreased to approximately 45% by 1991. Land application and composting accounted for 18.7% and 21.7%, respectively, of the biosolids reuse in 1991, and both uses had increased considerably from what was reported in 1988. The combined onsite storage and incineration of biosolids remained stable from 1988 to 1991 at approximately 14% of the total generated quantities. The 1998 information indicates a huge increase in land application, with nearly 68% of the material reported through the survey going to this reuse option. As a result, the percentage being disposed of in landfills was reduced to 9.1%. Incineration was the selected method of disposal for 5.6%, and 6.9% remained in onsite storage.

The 2001 information is currently incomplete, however the data available suggests an increase in landfill disposal of biosolids.

In 2003, CASA prepared an estimate of the volume of biosolids use as of 2001, based on data reported to the EPA. The 2001 estimates indicated that approximately 48% of the biosolids generated in California were land applied; and approximately 18% was disposed of in landfills. Incineration accounted for approximately 2.4% of the biosolids and approximately 1% was kept in onsite storage. (California Association of Sanitation Agencies 2003) The marked decrease in the relative amount being land applied probably reflects the restrictions on land application adopted by counties in the Southern San Joaquin Valley after 1998.

Most of the biosolids being ~~reused~~beneficially used in California are generated in the ~~Los Angeles and Orange County areas~~southern counties, as well as in the other large urban centers ~~of~~such as the ~~state (San Diego, the San Francisco~~ Bay Area, ~~Sacramento)~~. Much of this material is transported ~~a considerable distance~~ by truck to agricultural areas for land application. Table 2-1 identifies the ~~location and volume~~major sources of biosolids applied to land in ~~1998~~2001 by county, and Table 2-2 identifies the distribution of production by RWQCB region. The counties ~~supporting~~producing the largest amounts of biosolids ~~reuse~~

~~are Kern, Kings, Merced, San Diego~~in 2001 were Los Angeles, Riverside, San Bernardino, and ~~Solano~~Orange.

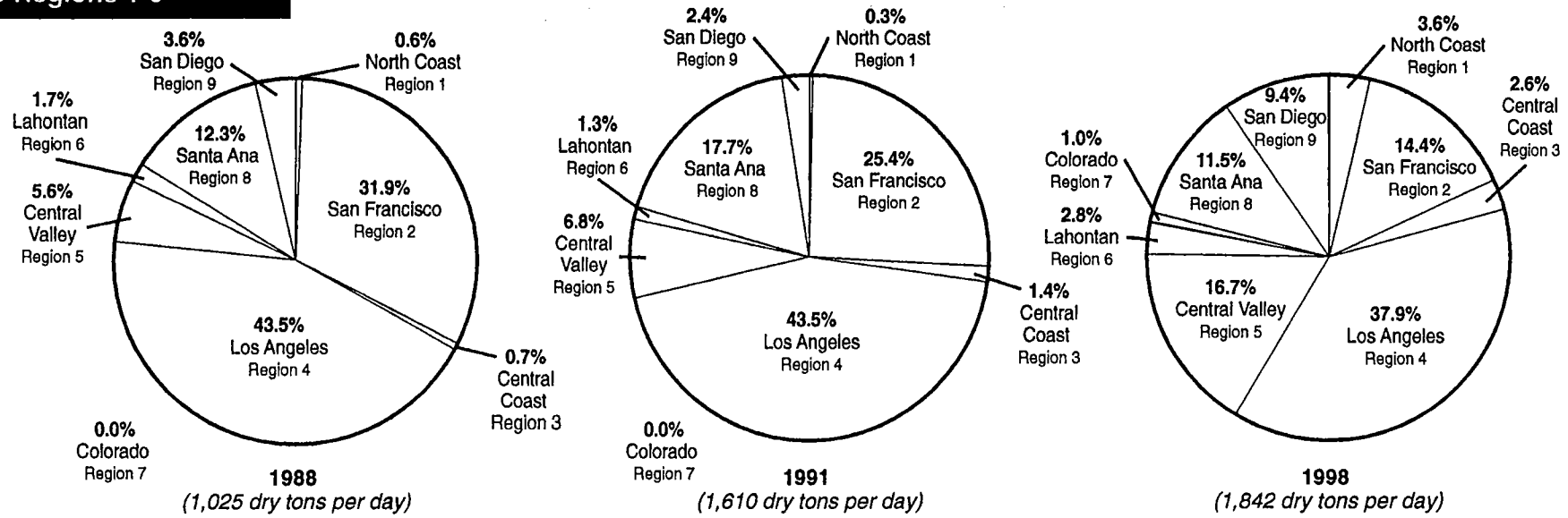
The CASA biosolids surveys did not ask the POTWs to specify whether their land application practices included agriculture, horticulture, silviculture, land reclamation, or home garden uses. In general, however, the most common land application practice is spreading and incorporation into agricultural land (California Water Environment Association 1996). Much smaller quantities are used in composting operations for eventual horticultural use and in land reclamation. Little or no material is currently being used to support silvicultural practices in California.

Agricultural Use. Figure 2-3 shows an example of a land application site for agricultural crop production, including staging (or temporary stockpiling of biosolids) at the farm, loading and spreading of biosolids, and incorporation practices. In agricultural use situations, biosolids are usually transported from the POTW of origin to the agricultural site in bottom-dumping trailers. When the material is received at the agricultural site, it may be dumped directly in long windrows on the fields, bottom-dumped into spreaders for immediate application, or placed in stockpiles for later transfer into spreaders. The biosolids are spread evenly across the fields and subsequently incorporated into the bare soil through disking or harrowing. In some instances, biosolids with a high moisture content may be transferred to liquid tank vehicles and injected into the soil (see Figure 2-3). Individual fields may receive one or several loads of biosolids before a crop is planted.

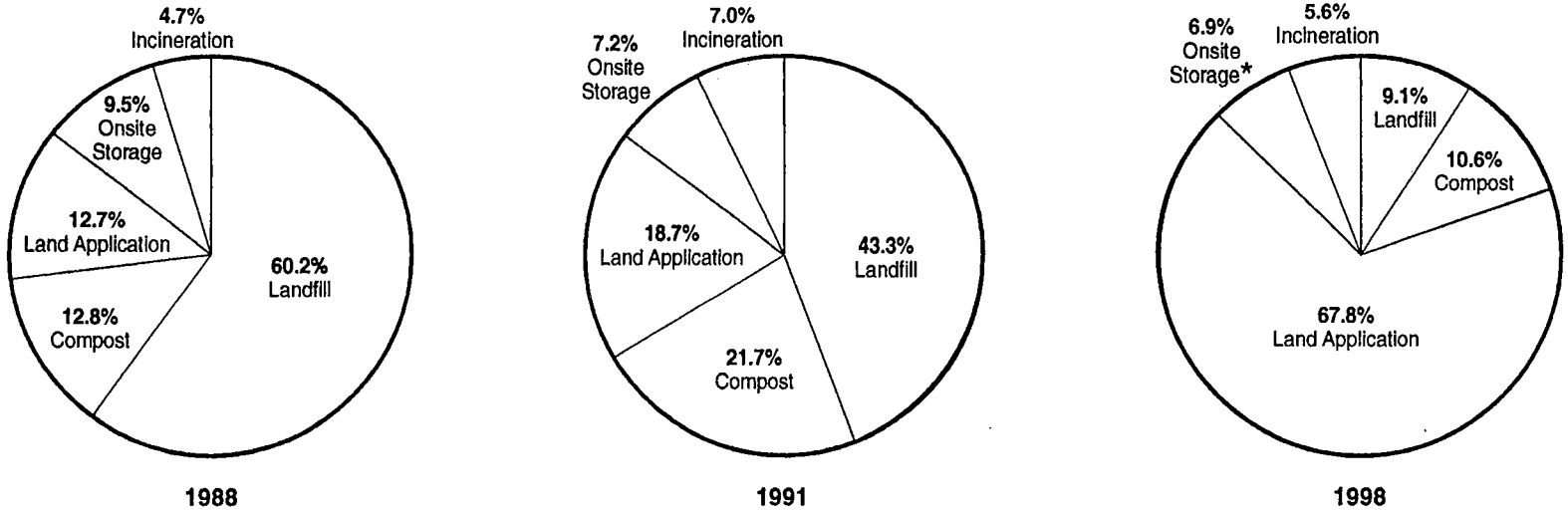
Horticultural Use. In California, horticultural use typically involves Class A Exceptional Quality biosolids (defined below in "Discharge Specifications") that have been composted with various types of green waste. Following the composting process, the biosolids may be packaged or made available to the public in bulk for home garden use. The GO is not intended to regulate these small-scale uses. The material is also used by various state and local entities and private businesses for large-scale landscape plantings such as road medians, parks, ornamental flower production, landscape and turfgrass production, and golf courses. It may also be used as a planting or potting medium in large nursery operations. Horticultural use areas are generally much more accessible to the public and involve a larger work force than do agricultural operations.

Silvicultural Use. Currently, no large-scale silvicultural uses of biosolids are under way in California. Silvicultural uses are common in other parts of the country, however, including the Pacific Northwest. A typical silvicultural operation would include transfer of biosolids by truck from the POTW to a commercial tree-growing operation. The material would be transferred to a hopper vehicle equipped with an impeller spreader for application. The land itself may be totally cleared or it may have trees already growing. The biosolids may or may not be mechanically incorporated into the soil**,** depending on the existing groundcover and site slopes. In some instances, liquid biosolids have been sprayed onto silvicultural sites.

Quantity of Biosolids Generated in RWQCB Regions 1-9



Distribution of Biosolids Reuse and Disposal



SOURCE:
California Association of Sanitation Agencies 1999.

* Onsite storage for this year only combines onsite and offsite storage and surface disposal.

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Figure 2-2
Distribution of Biosolids Generated in California (1988, 1991, and 1998)

Table 2-1.
Sources of Biosolids in California in 2001

County	Biosolids Quantity (dry tons per year)
Alameda	124,389
Contra Costa	14,036
El Dorado	2,211
Fresno	27,530
Humboldt	1,455
Imperial	343
Kern	38,677
Kings	1,267
Lassen	107
Los Angeles	413,258
Madera	771
Marin	1,562
Mariposa	290
Mendocino	799
Merced	2,462
Monterey	1,558
Napa	6,379
Nevada	1,007
Orange	86,710
Riverside	153,239
Sacramento	2,287
San Bernadino	108,465

Table 2-1. Continued

San Diego	35,368
San Joaquin	24,550
San Luis Obispo	7,862
San Mateo	7,162
Santa Barbara	14,437
Santa Clara	715
Santa Cruz	3,870
Shasta	1,781
Solano	28,172
Sonoma	10,174
Stanislaus	17,060
Tulare	11,639
Tulomne	347
Ventura	53,413
Yolo	1,447
Yuba	84
Total	1,206,883

Sources: California Association of Sanitation Agencies 2001.

Table 2-2.
Quantities of Biosolids Generated in California by RWQCB in 2001

Regional Board	Biosolids Quantity (dry tons per year)
North Coast	2,255
San Francisco	192,590
Central Coast	27,727
Los Angeles	470,980
Central Valley	133,411
Lahontan	4,890
Colorado River	153,582
Santa Ana	190,392
San Diego	31,057
Total	1,206,883

Sources: California Association of Sanitation Agencies 2001.

Table 2-2a
Application of Biosolids to Agricultural Lands by Crop Type, 2001

Food Crops (from EPA data disk)

Crop Type	Acres Applied	% of Total
Pumpkins	13	0.02
Walnuts	29	0.05
Safflower	560	0.96
Corn (Grain)	2,706	4.65
Wheat	54,825	94.3

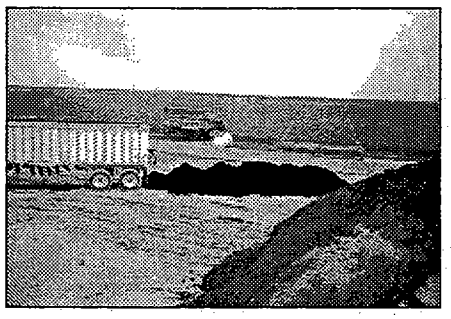
Total Acres Applied to Food Crops: 58,133

Non-Food Crops

Crop Type	Acres Applied	Tons/Acre Applied	% of Total
Alfalfa	7,415	N/A	9.9
Barley	1,922	N/A	2.56
Bermuda Grass	185	N/A	0.25
Cotton	7,428	N/A	9.92
Corn /Silage	11,689	N/A	15.6
Hay	145	N/A	0.2
Milo	4,480	N/A	5.98
Oats/Oat Hay/Sorghum	760	N/A	1.01
Pasture	16,874	N/A	22.5
Rye Grass/Mix	23,687	N/A	31.6
Sudan	298	N/A	0.4

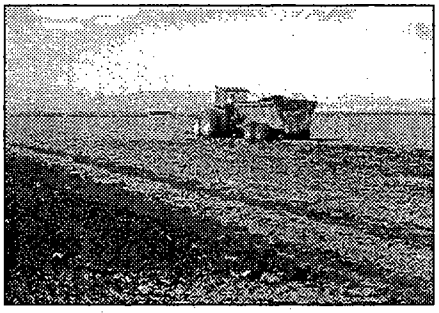
Total Acres Applied to Non-Food Crops: 74,883

Source: U.S. Environmental Protection Agency, Office of Water. Biosolids Database Management System. Washington, D.C. November 2003.

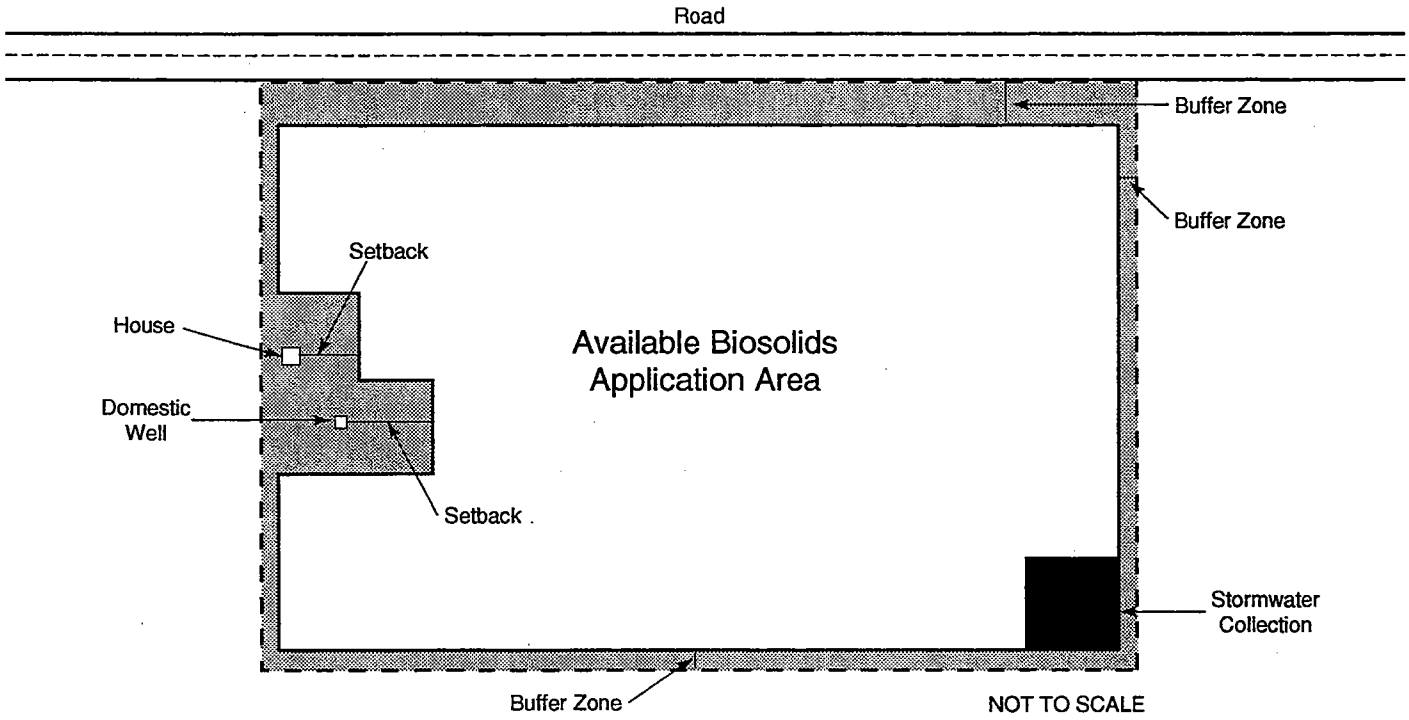


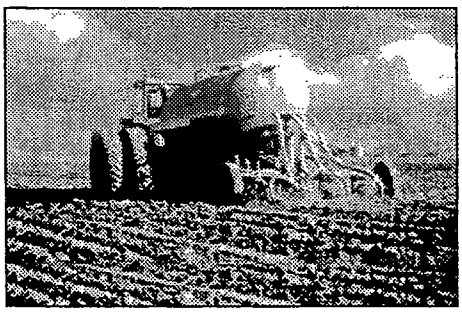
Biosolids staging at farm

Loading spreader

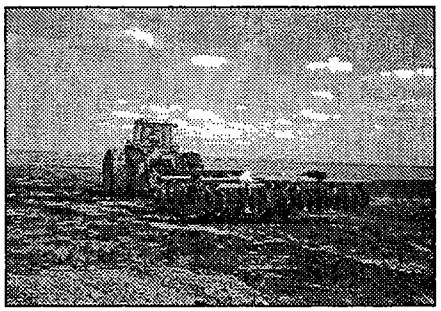


Land application by spreader





Land application by injection



Incorporation of biosolids into soil

SOURCE:
Carollo Engineers 1997. Photographs provided by the Merriwood Corporation and QUAD Consultants.

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Figure 2-3
Typical Biosolids Land Application Site

Land Reclamation. Land reclamation is not currently a major biosolids reuse option in California. The major use that would fall into this category is incorporation into final cover material at landfills. This use is not considered a disposal method because it is intended to increase the productivity of the cover soils. Other uses could include incorporation into surface materials at mining reclamation sites or soil borrow areas where subsoil material with low growing potential is exposed at the surface. Large-scale reclamation uses (i.e., for use in areas of more than 20 acres) are likely to occur in rural areas rather than urban settings because landfills and mining operations are typically not compatible with urban environments.

Future Biosolids Production and Use in California

Future biosolids production can be estimated based on population projections and estimated per capita generation rates. Statistics ~~were~~ compiled from the California Department of ~~Finance~~Finance's Demographic Research Unit and CASA ~~for~~are used in this EIR~~. The California~~ to make a broad estimate of the amount of biosolids that will be produced as California's population increases over time. This estimate does not distinguish between urban and rural population, although rural populations are generally not served by wastewater treatment plants and would not contribute to the total production of biosolids. The estimate assumes that the relative percentage of urban/rural residents will remain the same into the future. As a result, the following may underestimate future production if the general trend of increasing urbanization of the State's population continues.

Based on the Department of ~~Finance tracks and prepares reports on various population trends and regional distribution statistics. The use of census information to estimate biosolids generation must discriminate between rural and urban areas because urban areas are more likely to be served by municipal sewer and wastewater treatment systems. Based on census information, the population in urban areas in 1990 (when the last CASA survey was completed) was 29.8 million~~Finance's estimate, California's population in 2001 (the date of the latest CASA estimate of biosolids production) was approximately 34.37 million people. (California Department of Finance ~~1998a~~2003), ~~and t~~This ~~figure~~number is ~~expected~~projected to increase ~~by~~to approximately 4~~2~~5.~~3% to 42.4~~8 million people by ~~2015~~2020. (California Department of Finance ~~1998b~~2001). Based on the ~~1991~~2001 CASA estimate of biosolids generation (~~1~~5,~~610~~884 dry TPD) and assuming ~~that~~ the rate of per capita biosolids generation remains similar until 20~~15~~20, the total estimated production of biosolids is expected to increase to ~~2,329 dry TPD. If the percentage of biosolids that are land applied remains constant in the next 15 years, the amount of material being land applied would be 1,579 dry TPD in 2015, with an annual total of 576,690 dry tons~~approximately 7,840 dry TPD.

Reuse and disposal practices in California have changed over the years, as can be seen in the differences between the 1988 and 1998 CASA surveys. Consequently, it is difficult to predict how the additional biosolids generated in California will be used and disposed of in the future. The costs of all treatment and disposal options are likely to increase as land values and regulatory controls increase. The future disposal destinations of biosolids will also be affected by available space in landfills, public perception and government policies toward

acceptable uses of biosolids, and new information developed by the scientific community. Given that biosolids generation will increase substantially along with the state's population, it is clear that the demand for land application sites will increase as well.

Existing Regulatory Programs

The principal regulatory programs that currently have an influence over biosolids disposal and use include the RWQCB implementation of water quality protection programs under the Clean Water Act and California Porter-Cologne Water Quality Control Act, implementation of the federal Part 503 regulations for biosolids management by EPA, and local control of waste disposal at the county level through ordinances and land use regulations. A more detailed description of these and other, less influential state programs is contained in Appendix C.

State Programs—Role of RWQCBs

In California, the land application of biosolids by individuals or parties not involved in biosolids generation is currently regulated primarily through the issuance of waste discharge requirements (WDRs) by the individual RWQCBs in accordance with Section 13260 of the Porter-Cologne Water Quality Control Act. Existing biosolids land application projects have been permitted with individual WDRs issued in several of the nine RWQCB regions. The WDR process requires a potential discharger of biosolids to prepare a Report of Waste Discharge that describes the biosolids application project in detail. The RWQCB then evaluates the project and prepares WDRs that specify discharge conditions, prohibitions, and monitoring and reporting requirements for the project. The RWQCBs often make the WDR process contingent on the project's adherence to the federal Part 503 regulations. Several RWQCBs have adopted waivers for WDR preparation if the biosolids application project would involve biosolids with low pollutant and pathogen concentrations, as specified in the Part 503 regulations (see details below under "Discharge Specifications").

Federal Programs—Part 503 Regulations

The federal regulatory program for biosolids land application is based on the Part 503 regulations. These regulations are overseen by EPA and are considered self-implementing. No site permit is issued for the land application of biosolids. Instead, permits are issued to the biosolids generator. Part 503 restrictions and conditions are typically included in the National Pollutant Discharge Elimination System (NPDES) permit issued by the RWQCB for the operation of a POTW. The Part 503 regulations establish limits for pollutant levels;

operational standards and management practices; and monitoring, record keeping, and reporting requirements. The Part 503 regulations are applicable to projects that generate sewage sludge to produce biosolids or material derived from biosolids. The following section describes the details of the Part 503 regulations as they apply to land application of biosolids.

Discharge Specifications

EPA developed the Part 503 regulations to primarily protect the public and agricultural productivity. An emphasis was placed on persons who are extensively exposed to biosolids material (primarily POTW operators and persons applying biosolids to the land), from pathogens and pollutants. The Part 503 regulations establish two pathogen reduction standards for land-applied biosolids: Class A biosolids are treated sufficiently for all pathogens to be essentially eliminated, and Class B biosolids have been treated sufficiently for the level of pathogens to be substantially reduced but not completely removed. Class A biosolids must be monitored for bacteria growth at the time of use. Land application of biosolids that meet Class B criteria are restricted by the following conditions:

- food crops with harvested parts that touch the soil and are totally above the soil cannot be harvested for 14 months,
- food crops with harvested parts below the soil cannot be harvested for 20 months if biosolids remain on the land surface for at least 4 months before being incorporated into the soil,
- food crops with harvested parts below the soil cannot be harvested for 38 months if biosolids remain on the land surface for less than 4 months before being incorporated into the soil,
- feed and fiber crops cannot be harvested for 30 days after biosolids application,
- animals cannot be grazed on the site within 30 days of biosolids application,
- turf cannot be harvested for 12 months if the site would have a high potential for public exposure,
- public access is not allowed for 12 months to land with high potential for public exposure, and
- public access is not allowed for 30 days to land with low potential for public exposure.

Part 503 regulations for reducing vector attraction specify several alternative treatment processes and management practices that the biosolids must undergo. Vectors are pests such as flies, mosquitos, and rodents that can be attracted to incompletely treated biosolids

and could transmit diseases to other organisms. Biosolids must be treated to at least Class B level for pathogen and vector reduction levels to be land applied.

The Part 503 regulations establish minimum standards for concentrations of nine pollutants in biosolids that are to be applied to land (Table 2-3). Biosolids are considered Class A Exceptional Quality (EQ) if they meet all of the pollutant concentration limits and vector attraction reduction options 1-8 in Part 503.88, as well as Class A pathogen reduction standards. EQ biosolids can be distributed in bulk or packaged and are not subject to general management practices other than monitoring and reporting to confirm that the criteria have been met. Class A biosolids that contain any one of the nine pollutants (Part 503, Table 1) in concentrations exceeding the pollutant concentration limits for EQ biosolids, but that are below the ceiling limits, can be applied to land but are subject to cumulative and annual pollutant loading restrictions depending on their intended use, as shown in Table 2-3. Class A biosolids with all pollutants below the pollutant concentration limits for EQ biosolids can be applied without loading rate restrictions. If the biosolids contain any of the listed pollutants at concentrations that exceed the ceiling concentration limits, they cannot be applied to land.

Other Policies and Procedures

The Part 503 regulations specify several standard conditions that must be followed for site management; distribution and marketing of biosolids products; and monitoring, record keeping, and reporting procedures. If biosolids do not meet EQ standards, those general management practices that are specified include the following:

- biosolids cannot be applied to a site if doing so is likely to affect a threatened or endangered species;
- biosolids must not be applied to frozen, snow-covered, or flooded ground; and
- biosolids cannot be applied to land within 10 meters (33 feet) of a surface water body.

In some cases, the Part 503 regulations contain specific requirements for labeling of biosolids materials and products to be marketed, sold, or given away. The label must contain the name of the person or agency that prepared the biosolids, statements of land application prohibitions with respect to pollutant limits, and loading rates. The required monitoring frequency is determined based on the quantity of biosolids generated at the POTW. Monitoring can vary from once per year for small operations to monthly for large POTWs. A report must be submitted to EPA once per year and monitoring records must be kept for 5 years.

The EPA does not take an active role in inspecting sites to which biosolids are applied for compliance with the Part 503 regulations. The EPA's Office of the Inspector General issued a status report on the Land Application of Biosolids in March 2002 in response to a series

Table 2-3.
Regulatory Pollutant Concentrations and Loading Rates under Part 503 Regulations

Pollutant	Pollutant Concentration in EQ Biosolids (mg/kg)	Ceiling Concentration in Biosolids Applied to Land (mg/kg)	Cumulative Pollutant Loading Rate Limits (kg/ha)	Annual Pollutant Loading Rate (kg/ha/yr)
Arsenic	41	75	41	2
Cadmium	39	85	39	1.9
Copper	1,500	4,300	1,500	75
Lead	300	840	300	15
Mercury	17	57	17	0.85
Molybdenum	--	75	--	--
Nickel	420	420	420	21
Selenium	100	100	100	5
Zinc	2,800	7,500	2,800	140
Applied to:	Bulk biosolids and bagged biosolids	All biosolids that are land applied	Bulk non-EQ biosolids	Bulk biosolids

_____

Notes: mg/kg = milligrams per kilogram.
kg/ha = kilograms per hectare.
kg/ha/yr = kilograms per hectare per year.

Sources: Pollutant concentration in EQ biosolids—Part 503, Table 3; ceiling concentration in biosolids applied to land—Part 503, Table 1.

of allegations by the National Whistleblower Center (a non-governmental agency) that EPA's biosolids oversight is lax. The status report found that the EPA has not fully funded biosolids program staff, the program for delegating biosolids responsibility to the states has not been adequately funded and few states have chosen to join, the EPA does not have a central system for responding to and tracking health complaints and generally considers such complaints to fall outside its jurisdiction, the EPA has not updated its methodologies for risk assessment and pathogen testing, and EPA could do a better job responding to public perceptions of biosolids being a health concern.

For the most part, these issues are outside the PEIR's area of concern. The proposed GO would assert state authority over the application of biosolids to land. As such, it would provide for regulatory oversight of beneficial use by the SWRCB and individual RWQCBs. Because the GO incorporates requirements that are more stringent than those in the Part 503 regulations, the shortcomings of EPA oversight are not pertinent.

On December 31, 2003, the EPA announced in the Federal Register its final action plan in response to the NRC recommendations arising from the Biosolids Applied to Land report. This response addresses the above issues. (Federal Register, Volume 68, page 75531) For a more detailed discussion of the final action plan, see Chapter 5 of this EIR.

Local Programs—County Ordinances

Several California counties have adopted local ordinances that directly regulate biosolids reuse and disposal practices or indirectly affect biosolids management by requiring conditional use permits for certain activities. The local ordinance adoption process could affect the implementation of permitting procedures under the GO. RWQCB staff engineers and reviewing agencies would need to be aware of local permit requirements and conditions of local ordinances to assess the applicability of the GO to specific projects.

Of the 58 counties in California, ~~16~~ 17 currently have ordinances that relate directly to land application of biosolids. Three counties have outright bans on land application, ~~seven~~ nine have effective bans (their ordinances are so restrictive that they effectively discourage land application), and five allow regulated use. The remaining ~~42~~ 41 counties without ordinances rely on the RWQCBs to regulate land application through the WDR process. These local ordinances are important because they restrict the areas within the state that can currently accommodate land application of biosolids, and they supercede the controls of the proposed GO where they are more restrictive.

General Order Program Objectives

The goal of the GO is to provide a clear and consistent regulatory process that is adequately protective of environmental resources, streamlines the permitting process for land application of biosolids, and includes policies and procedures that ensure continued refinement of biosolids disposal practices and protection of the environment. Therefore, the GO is intended to:

- comply with Section 13274 of the California Water Code and the judicial order by the Superior Court of California for the County of Sacramento by adopting statewide general WDRs for the discharge of dewatered, treated, or chemically fixed sewage sludge (biosolids) for beneficial use as a fertilizer and/or soil amendment;

- provide a regulatory framework for biosolids application to land that can be used by individual RWQCBs to act on NOIs filed by potential dischargers in a manner that avoids or mitigates potentially adverse environmental effects; and

- provide a flexible regulatory framework that allows implementation of a biosolids disposal program for land application operations at the regional level and contains requirements that are based on sound science and best professional judgment.

Each of these program objectives is described below.

Comply with California Water Code and Judicial Order

The first objective of the GO, to provide a statewide regulatory program, is based on the need to comply with Section 13274 of the California Water Code, which requires the issuance of WDRs for projects that may affect waters of the state, and to respond to the legal challenges brought against the individual GOs proposed by the Central Valley RWQCB. In particular, any proposed program must be applicable on a statewide basis because biosolids generated within one region may be applied in a different area. In addition, resource protection factors specific to California that are not addressed through the Part 503 regulations must be incorporated into a statewide regulation.

The existing process of individually issuing WDRs for land application of biosolids could lead to inconsistencies between regions that may affect the feasibility, operation and maintenance procedures, and costs of land application. Consequently, a statewide regulation must promote an effective statewide permitting process to minimize inconsistent regional permitting requirements.

Provide Regulatory Framework for RWQCB Permit Process

The objective of creating a cost-effective regulatory framework is a critical aspect of streamlining the RWQCBs' processes for biosolids management, CEQA review, and permitting. The current process (individual review and issuance of WDRs and the corresponding CEQA environmental review requirements implemented by each RWQCB) requires a substantial expenditure of resources by regulatory agencies and other involved parties. The federal Part 503 regulations are developed using environmental risk exposure models to ensure that the regulatory criteria cover a wide range of environmental conditions under which biosolids may be applied. Consequently, for most land application projects, the regulatory framework should allow for streamlined permit and CEQA review and approval procedures if the threat of adverse environmental effects is determined to be negligible. The approach of establishing a general order provides each RWQCB with objective screening criteria against which to evaluate each NOI and through which routine land application projects can be expedited. The regulatory program must also provide objective criteria and guidelines under which each RWQCB can implement additional review or develop supplemental permit conditions if these are found to be necessary to ensure environmental compliance.

Provide Flexible Regulatory Framework

The third objective of the GO is to provide a regulatory setting that uses the environmental risk-based analyses developed for the Part 503 regulations or an equivalent analysis so that the program is adequately protective of the environment. A program that has statewide application and involves complex pollutant management issues must be based on thorough scientific justification. In addition, the regulatory program must be responsive to new scientific evidence relating to biosolids and allow for incorporation of new practices and procedures if the scientific community determines that changes are necessary. Areas of controversy are the safety of land application of biosolids, the applicability and level of protection afforded under the federal Part 503 regulations, and the efficacy of the GO regulatory framework in the evaluation and protection of site-specific resources. Therefore, any proposed regulation related to biosolids land application should include mechanisms that allow for incorporation of future management practices that are determined to better protect environmental resources or improve the regulatory and permitting process.

Description of General Order

Overview

The proposed GO was developed to provide a single regulatory framework for the land application of biosolids in California and to streamline the permitting process that each RWQCB uses for biosolids application projects. Provisions of the GO were based largely on the federal Part 503 regulations to ensure that the state regulation incorporates the extensive health risk assessments and scientific review that went along with developing the federal regulation. Baseline criteria that were established under the Part 503 regulations must be met under the GO and associated general WDRs. Projects that fail to meet the criteria established by the GO may still apply for an individual permit from the RWQCB. This section generally describes the principal permit conditions and procedures of the GO.

Applicability

For the purposes of the GO, *biosolids* are defined as only those sewage sludges produced at municipal wastewater treatment plants that meet the requirements of the Part 503 regulations. Unstabilized sewage sludge, septage, and wastes that do not meet the Part 503 regulations or are determined to be hazardous under Title 22, Division 4.5, Chapter 11, Article 3 of the CCR would not be regulated under the GO.

Under the GO, the *discharger* is defined as primarily the landowner and generator, but could also include any individual, business, or organization involved in the transportation, use, and application of biosolids. The discharger would be legally responsible for implementing and complying with the provisions of the general WDRs issued by the RWQCB in accordance with the GO.

A biosolids application project that is permitted under a single NOI must involve less than 2,000 acres of land that receive biosolids, and all application sites must be within 20 miles of each other. In addition, each landowner involved with a biosolids application project must file a separate NOI, pay a separate filing fee, and list each generator associated with the proposed operation as co-dischargers. A permitted project applicable to the GO may involve a single application of biosolids or repeated applications. The identification of permitted activities under the GO does not preempt or supersede the authority of local agencies to prohibit, restrict, or control biosolids reuse. The discharger is responsible for making inquiries about permitted uses and obtaining applicable local permits and authorizations.

An important component of the GO is the requirement that each biosolids application project operator, before applying any biosolids, must prepare and submit an NOI for the area in

which the biosolids are to be applied. The appropriate RWQCB would then review information contained in the NOI and, if it finds the information to be adequate, issues a Notice of Applicability under the general WDRs of the GO along with discharge monitoring requirements. A complete NOI includes a preapplication report that provides the RWQCB with specific information relating to each field or distinct application area, including:

- contact personnel;
- project location;
- map that shows site topography and elevation; staging/storage and application areas; and nearby residences, roads, surface waters, and groundwater wells;
- source and chemical test results for biosolids;
- description of proposed application area, application practices, and type of crops to be grown;
- spill response plan; and
- any applicable erosion control, biosolids storage, and groundwater monitoring plans that would be required under the GO.

An annual filing fee is required for each year that the project is operating and is based on the threat to water quality and complexity of the project as identified in 23 CCR 2200. Biosolids projects encompassing an area of 40-2,000 acres would be designated a Category II threat to water quality and given a Category "b" complexity rating. Biosolids projects of less than 40 acres would be classified a Category III threat to water quality and given a Category "b" complexity rating.

Relationship of the GO to Part 503 Regulations

Some of the minimum standards established under the Part 503 regulations are applicable to the proposed GO program:

- Biosolids must be treated to reduce potential disease-causing pathogens.
- Class A biosolids have been treated sufficiently that pathogens are essentially eliminated; Class A biosolids must be monitored for bacteria growth at the time of use.

- Class B biosolids have been treated sufficiently that pathogens are substantially reduced, but not completely eliminated. Land application of biosolids that meets Class B criteria is restricted by the following conditions:

  - food crops with harvested parts that touch the soil cannot be harvested for 14 months after biosolids application;

  - food crops with harvested parts below the soil cannot be harvested for 20 months after application if biosolids remain on the land surface for 4 months or longer before being incorporated into the soil;

  - food crops with harvested parts below the soil cannot be harvested for 38 months after application if biosolids remain on the land surface for less than 4 months before being incorporated into the soil;

  - food and fiber crops cannot be harvested for 30 days after biosolids application;

  - animals cannot be grazed on the site within 30 days of biosolids application;

  - turf cannot be harvested for 12 months after biosolids application if the site is likely to have extensive public exposure (e.g., golf courses, parks);

  - public access to land that is likely to have extensive public exposure is not allowed for 12 months after biosolids application; and

  - ~~grazing of milking animals used for producing unpasteurized milk for human consumption is prevented for at least 12 months if the field is used as pasture; and~~

  - public access to land that is unlikely to have extensive public exposure is not allowed for 30 days after biosolids application.

The Part 503 regulations also outline several alternative chemical and physical treatment processes and management practices that the biosolids must undergo to reduce vector attraction. Biosolids must be treated to meet at least Class B criteria for pathogen reduction and vector reduction levels before they can be applied to land.

The material quality of biosolids that are to be applied to land under the GO must comply with minimum standards for concentrations of 10 metals, nine of which are regulated under the Part 503 regulations (see the discussion below in "Discharge Prohibitions" and "Discharge Specifications"). Restrictions on pollutant addition levels are described above in "Discharge Specifications".

Discharge Prohibitions of the GO

The GO contains prohibitions that apply to all land application projects that request authorization. In general, biosolids must not be applied under the following conditions:

- the biosolids to be discharged cannot contain any chemical at a concentration in excess of the federal or state regulatory limits for classification as a hazardous waste;
- the biosolids cannot be discharged except as allowed at authorized storage, processing, and land application sites;
- no application is permitted until the RWQCB has issued a Notice of Applicability, a set of individual WDRs, or a waiver of WDRs;
- no application is permitted if the discharge would cause or threaten to cause pollution or create a nuisance as defined by Section 13050 of the California Water Code;
- no application is permitted that would cause a violation of the Safe Drinking Water and Toxic Enforcement Act (Health and Safety Code Section 25249.5);
- no application is permitted to areas not specified in the applicant's NOI;
- no application is permitted to surface waters or drainage courses;
- no application is permitted when the application rate would exceed the nitrogen requirements of the vegetation or the rates that would degrade groundwater unless specifically authorized (application in excess of nitrogen requirements may be allowed for land reclamation sites if a certified agronomist, registered agricultural engineer, or registered civil engineer demonstrates that application would not degrade the quality of underlying groundwater);
- no surface water runoff resulting from irrigation of the site is permitted within 30 days of application unless a sufficient buffer of grass (more than 33 feet) is present to prevent biosolids from being carried in runoff from the application site;
- no application is permitted to frozen or water-saturated ground or during periods of rain heavy enough to cause runoff from the site;
- no application or incorporation into the soil is permitted when wind may reasonably be expected to cause airborne particulates to drift from the site;
- no application is permitted in areas subject to erosion or washout offsite; and

- discharge of biosolids with pollutant concentrations greater than those shown in Table 2-4 is prohibited.

Discharge Specifications of the GO

The GO contains specifications for the quantity and quality of biosolids that are allowed to be land applied. Most of these specifications are similar to the requirements of the Part 503 regulations and include the following:

- Biosolids must be treated to meet Part 503 standards for vector reduction and be treated to either the Class A or Class B level of pathogen reduction standards.

- Cumulative lifetime metals loading limits for a given application site shall not exceed those presented in Table 2-5 (including background soil levels and levels in applied biosolids).

- Biosolids application rates shall not exceed the agronomic rate for nitrogen for the crop being planted except as allowed for reclamation sites or biosolids research projects.

- Following incorporation of biosolids into the soil, tilling practices must minimize erosion of the site resulting from wind, stormwater, and irrigation water.

- If the slope of the application site is greater than 10%, an erosion control plan must be prepared by a qualified erosion control specialist.

- For Class B biosolids, the harvesting period for crops is restricted as described in the Part 503 regulations. In addition, the location of application is specified with respect to property lines, municipal and agricultural supply wells, public roads, surface waters, agricultural buildings, and residential buildings.

Storage and Transportation

The GO specifies conditions for the storage and transportation of biosolids. Major conditions of the GO include the requirement for biosolids to be transported in covered, leakproof vehicles; drivers must carry a copy of an approved spill response plan and be trained with regard to the proper response to accidents or spill events. The GO defines *storage* as placement of biosolids on the ground or in nonmobile containers for more than 7 consecutive days at an intermediate site other than the place of generation and/or processing. If biosolids are to be stored at the application site, the operator must prepare and implement an RWQCB-approved storage program. Biosolids must not be stored for longer than

Table 2-4.
Pollutant Concentration Limits for Biosolids Being Land-Applied

Constituent	Ceiling Concentration (mg/kg dry weight)
Arsenic	75
Cadmium	85
Chromium	3,000
Copper	2,500
Lead	350
Mercury	57
Molybdenum	75
Nickel	420
Selenium	100
Zinc	7,500

Table 2-5.
Cumulative Loading Limits for Biosolid Land Application Sites

Constituent	Kilograms per Hectare	Pounds per Acre
Arsenic	41	36
Cadmium	39	34
Copper	1,500	1,336
Lead	300	267
Mercury	17	15
Molybdenum	18	16
Nickel	420	374
Selenium	100	89
Zinc	2,800	2,494

7 consecutive days; storage areas must be covered between October 1 and April 30 during periods of runoff-producing precipitation; public access to storage areas must be restricted; and control measures should be implemented to prevent leachate into the soil, surface runoff, and washout from floods.

Provisions

The GO contains 20 general conditions and procedures that must be followed by the discharger. The general provisions are summarized under the following categories of responsibilities:

- **Obtaining, maintaining, and terminating coverage under the GO:** An NOI must be submitted for each biosolids source and discharge site. Specific agencies, adjacent residents, and adjacent landowners identified in the GO and any local agency with jurisdiction over the application site must be notified. The RWQCB must be notified in advance of any transfer of the project to another party. The RWQCB must be notified of project completion through submittal of a Notice of Termination and a Final Discharge and Monitoring Program report. Provisions of the general WDRs issued by the RWQCB are severable.

- **Chain of responsibility:** Individual property owners and companies responsible for biosolids discharges and site operations are primarily accountable for compliance and enforcement actions under the GO. The discharger is responsible for informing all biosolids haulers using the land application site of the conditions contained in the GO. Individual property owners are responsible for applicable crop selection, property access, and harvesting restrictions under the GO.

- **Monitoring, reporting, and record keeping:** The preapplication form that is attached to the GO describes the general reporting requirements and specific groundwater monitoring requirements (if deemed necessary). Groundwater monitoring would generally be required if the depth to groundwater at the application site is less than 25 feet and biosolids would be applied to the site more than twice in a 5-year period. If required, one upgradient and two downgradient wells must be monitored annually at each application site to evaluate water level, pH, total dissolved solids, sodium, chloride, nitrate, and total nitrogen levels.

  The discharger is responsible for implementing the requirements of the GO and for site operations and conducting the required monitoring programs. Sampling must be conducted using approved methods, accurate and properly calibrated equipment, and laboratories certified by the California State Department of Health Services. Information that must be recorded includes the quantity of biosolids applied at each site along with its nitrogen content, crops grown, and total pollutant loading. The discharger must notify the RWQCB of any noncompliance with the GO within 24

hours. The discharger must keep monitoring records for at least 3 years. Annual monitoring reports submitted to the RWQCB must be signed and certified by the discharger or a duly authorized representative.

GO Exclusion Areas

The proposed GO specifies several areas of the state within which biosolids application projects under the GO cannot be permitted. Generally, the exclusion areas are unique or valuable public resources, jurisdictional waters or preserves, or state-designated management areas. The general areas excluded from this GO are the following:

- the Lake Tahoe Basin;
- the Santa Monica Mountains Zone;
- the California Coastal Zone;
- the area within 0.25 mile of a wild and scenic river;
- the jurisdictional Sacramento-San Joaquin River Delta;
- Suisun Marsh;
- the area under the jurisdiction of the San Francisco Bay Conservation and Development Commission; and
- several specific areas within the jurisdiction of the Lahontan RWQCB, including the Antelope Hydrologic Unit above 3,500 feet, areas in the Mojave River Planning Area, the Hilton Creek/Crowley Lake areas, and areas of the Mono-Owens Planning Area.

These areas are not included in the analysis of this EIR.