

# **Guidance Document for Wastewater Agencies Who Oversee Biosolids Land Application Contractors**

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**Prepared in collaboration with the CASA Regulatory Workgroup Biosolids Committee Subgroup**

## **Introduction**

Part 503 of the federal regulations explicitly states the biosolids preparer (i.e. the Agency) is ultimately responsible for ensuring the requirements of 503 are met. In land application programs directly managed by Agency employees (often in direct cooperation with farmers), the Agency has an inherent connection with the biosolids program to ensure local, state, and federal regulatory requirements are met.

***40 C.F.R. § 503 requires that [a]ny person who prepares sewage sludge shall ensure that the applicable requirements in this part are met when the sewage sludge is applied to the land.***

However, in land application programs fully contracted to a third party ((ie. Contractor) in which the contractor is responsible for transportation, land application, and recordkeeping), it is often left to the Contractor to self-report compliance with Part 503 requirements. While contractors should be complying with regulatory and contractual requirements, it is ultimately the Agency's responsibility to provide adequate oversight of contractor operations, particularly field location, crops grown, and biosolids application rate, described later in this document. Oversight tasks are not explicitly stated in the regulations, but best practices have been developed through experience This document provides concise guidance for the portion of a biosolids program related to overseeing contractor operations.

Many aspects of a contractor's operation can be reviewed through a desktop review, such as field permits, trucking routes, crops to be grown, field locations, and timing of application. At a minimum, such information should be provided for review once a year, but an Agency may specify an increased frequency. Other reviews an Agency may conduct include truck inspections and site visits to verify that land application practices are consistent with federal, state, and local (county) regulations and are an important part of Contractor oversight. It is recommended to inspect new sites prior to start of biosolids deliveries. Agencies can create inspection sheets to highlight compliance aspects of local county ordinances as well as federal regulations. The size and staffing of an Agency's land application program, as well as their experience with the Contractor, should be considered when establishing the frequency of site visits. Additionally, after biosolids application has ended for a particular field and crops are being grown, the Agency may wish to follow up to verify the crop being grown at the site and that harvest will or has taken place. This could also include communications with the farmer or rancher whose land is used.

## **Purpose of Guidance**

This document is designed for wastewater agency (Agency) workers who produce biosolids that are land applied and all parties involved in the process. In the spirit of EPA 503.7, this guidance embraces the Agency's "cradle-to-grave" involvement in all aspects of biosolids management, including transportation and beneficial use.

The need for Publicly Owned Treatment Works (POTW) oversight cannot be overstated and experience has shown that without it, issues with compliance may result, followed by the development of restrictive or prohibitive ordinances. Federal, State, and local officials often do not have the resources to oversee individual operations and thus may rely on complaints to initiate inspections. If operations are not being done properly, the harm done to the public trust may be irreparable, and a POTW's environmental mission and stewardship policies violated. Ordinances and/or enforcement may result which will limit management options and add significant cost. A guiding principle should be that a POTW can never wave goodbye to their biosolids as they leave the gate and assume a contract absolves them of responsibility and liability. Good communication between the POTW and contractors are vital to ensure proper management. The following sections provide more information on the different activities, as well as biosolids management contract elements. Finally, attached to this guidance is an example contract language.

## **Hauling**

Incidents can happen when the biosolids are in the trailer and being driven to the site. The beneficial reuse of the biosolids by land application involves the transport of biosolids by specially designed (leak proof) tractor-trailer trucks over city, county, and state roadways. Municipal wastewater biosolids are stabilized substances that pose an extremely limited health hazard. However, to mitigate potential nuisance and traffic safety conditions, a contingency plan should be required by the Agency prior to and in case of a biosolids spill during transport. That contingency plan should be implemented, together with such additional action as may be necessary, in the event of an accidental spill.

Communication between the dispatcher/driver and other authorities is essential in the event of unforeseen accidents while hauling biosolids. Consequently, all biosolids hauling vehicles should be equipped with cellular telephones. Although biosolids are not a hazardous material and pose only a limited health hazard, personnel responding to a spill should use the same protective equipment as when working around sewage; this would include protective footwear, long-sleeved and long-legged clothing, gloves and eye protection as required by individual circumstances.

Routes should be provided to the POTW and care taken to minimize residential traffic. Including primary routes and backup routes in the contract/agreement is recommended as well as a means to add new sites during the contract term. In addition, Agency employees should drive the routes to identify any potential sensitive receptors (e.g. schools, residents, commercial buildings). Procedures should be outlined to delineate responsibility for road repair if damaged from the vehicles. Truck cleaning procedures (trailers, tires) should be outlined, tarping of all loads, and spill mitigation plans should be described and included. Emergency contacts for all likely encounters should be on every truck. There should be agreements for percent solids ranges that the POTW must provide the hauler and a means to ensure they are met.

Trailer type should also be considered when evaluating compatibility with loading at the POTW and unloading/receiving at the biosolids management site. Size restrictions and accessibility may require

specific trailer types for loading and unloading. Some trailers, such as end-dump trailers, may pose an increased risk of tipping when unloading on uneven terrain or in high wind events.

The Agency is also considered a “hiring entity” under the newly adopted Advanced Clean Fleets (ACF) regulations issued by the California Air Resources Board (CARB). The ACF Regulations require hiring entities (or agencies) to inform the Contractor (e.g., third party hauler) of ACF requirements for transitioning fleets to near-zero emission vehicles (N-ZEVs) and/or zero emissions vehicles (ZEVs). Additionally, the Agency is required each calendar year to 1) check that the hired Contractor’s fleet is listed as compliant on CARB’s ACF webpage, or 2) for those hired Contractor’s that are not listed on CARB’s ACF webpage, obtain a signed statement from the hired Contractor stating they are not subject to the High Priority and Federal Fleets regulations. If the Agency also directs or otherwise manages the day-to-day operation of a Contractor’s fleet, they are deemed the “controlling party”. The Contractor must then follow the requirements for which the controlling party is registered (e.g., State and Local Government Agency Fleet Requirements or the High Priority and Federal Fleets Requirements) to be compliant with the ACF Regulations.

## **Spills**

Contractor should report all accidents involving vehicles transporting biosolids regardless of whether any biosolids spilled from the trailer. In case of any spills/accidents occurring during the hauling of the dewatered biosolids, the Contractor should be responsible for all clean up and any fines or penalties. Contractor should follow all applicable laws and regulations concerning said spills, including contact with the appropriate agencies. Contractor should provide precise location of the spill and photos of the spill and cleanup.

### **Minor Spill**

In the case of a minor spill of a small quantity of biosolids, the driver should:

1. Notify one or more of the individuals on the Emergency Contact Roster by telephone.
2. Flag the affected area to divert traffic away from cleanup operations.
3. Manually load the spilled product (if appropriate) and continue transport to the land application site.
4. If the spill was caused by a mechanical malfunction, the driver should make appropriate repairs and/or should contact his or her maintenance supervisor to make appropriate repairs prior to further transport.

### **Major Spill**

In the case of a major biosolids spill where a significant quantity or all the biosolids are spilled from the vehicle, the driver should:

1. Notify one or more of the individuals on the Emergency Contact Roster by telephone. The Emergency Contact individual should immediately dispatch cleanup equipment and repair personnel as necessary and contact the agencies on the Emergency Notification List.
2. Flag the affected area to divert traffic away from the spill and the cleanup operations.

## **Farm Information**

The POTW should understand the relationship between the contractor and the farmer and ensure all data to demonstrate compliance with biosolids quality has been transmitted. Contractor should demonstrate how all setback requirements are maintained and how application rate is determined and executed. Request from the Application Contractor(s) a copy of the Consent and Access Agreement with all the landowners involved with the application program. If the landowner is not farming said property but is leasing it out to a farmer, then request the contract/agreement that the Application Contractor(s) have with that farmer. Confirm that the landowner received a copy of that document in their Consent and Access Agreement. These agreements/contracts need to have contact information in them for the farmer and landowner. With that information, the Agency can then establish a direct line of communication as needed with the farmer/landowner. If farm is in close proximity to residential properties, an information sheet should be developed and provided to homeowners who may be impacted by on/off traffic and the application process.

***40 C.F.R. § 503.12(h) requires an applier to provide the owner or lease holder of the fields information that includes what crops the land applier believes are in cultivation, the basis for agronomic rate calculations, and the amount of biosolids or sewage sludge that are applied.***

## **Agronomic Application Rate**

Biosolids are generally applied to fields prior to crop planting. The amount of biosolids that can be applied per acre depends on nitrogen needs of the crop to be grown. Application rates depend on the available nitrogen pre-existing in the soil, the concentration in the biosolids, and the uptake expected of the planned crop. This is called the agronomic application rate.

***40 C.F.R. § 503.14(d), ... bulk sewage sludge shall be applied to agricultural land at a rate that is equal to or less than the agronomic rate. Agronomic rate is the rate designed to provide the amount of nitrogen needed by the crop and to minimize the amount of nitrogen that passes below the root zone of the crop to the ground water.***

Each crop type has an estimated nitrogen utilization rate, which may differ according to the region. For example, alfalfa can utilize more nitrogen than wheat. Soil sampling or university literature are often the best sources for determining crop needs. Legumes which can fixate nitrogen from the atmosphere prefer the easier means of extracting it from biosolids, which may not always be noted in recommendations and if not, should be confirmed with agronomists. The nitrogen utilization of any crop depends on the growth rate, which in turn depends on climate, water, and other factors. The land applier will determine the amount of nitrogen the crop needs based on agronomic references and/or an agronomist who has evaluated the growing conditions of the area. This determination should be in the form of a written calculation that can be made available upon request to the Agency and applicable authorities. Also, each field has residual nitrogen in the soil that should be accounted for when determining the amount of nitrogen needed.

Ultimately, the most important detail to check on the reports is that Plant Available Nitrogen (PAN, see formula below) in biosolids is less than the nitrogen uptake rate in mass per acre minus the residual soil nitrogen in mass per acre.

$$\text{Plant Available Nitrogen (PAN)} = \text{NO}_3\text{-N} + K_{\text{vol}}(\text{NH}_4\text{-N}) + K_{\text{min}}(\text{Org-N})$$

Where:

- **NO<sub>3</sub>-N** is the nitrate-nitrogen content, often given directly by the laboratory. If only nitrate (NO<sub>3</sub>) is given, multiply by 0.226 to determine NO<sub>3</sub>-N
- **K<sub>vol</sub>** is the volatilization factor for estimating ammonia (NH<sub>3</sub>) remaining after atmospheric losses
- **NH<sub>4</sub>-N** is ammonium-nitrogen, which may be given as ammonia-nitrogen. As long as the value is in terms of nitrogen, either can be used
- **K<sub>min</sub>** is the mineralization factor for estimating how much organic nitrogen is expected to be released as PAN for the year
- **Org-N** is organic nitrogen, often given directly by the laboratory. If only Total Kjeldahl Nitrogen (TKN) is given, Org-N = TKN – NH<sub>4</sub>-N

Two major processes that must be estimated according to growing conditions are the amount of ammonia that will be lost to volatilization and the amount of organic nitrogen that will be made available by mineralization. The land applier should provide their estimates of these rates, which may be conservative numbers they feel apply to all settings or site-specific rates. Volatilization rate depends on numerous factors including temperature, wind, and soil pH, as well as the means by which the biosolids have been applied. Mineralization rate depends on soil temperature, moisture, aeration, and other factors but a default value of 25% in the year of application is recommended by Oregon State in research sponsored by USEPA.

If a contractor applies biosolids from more than one generator to a field, special care must be taken to ensure proper application rates are used and that each are accounted for separately. Some locales may require that fields be separated so POTW A biosolids is applied to a set part of the field and POTW B is applied independently to a separate part of the field. This can become difficult to manage so good communication and understanding between the POTWs and the contractor is vital. Typically, the Contractor's reports provide a summary of the Agency's biosolids as well as what occurred on each field, which may include biosolids from other generators. As one simple check of the integrity of the report, make sure that the total amount of biosolids applied does not exceed the amount of biosolids applied by the single generator.

If required by Part 503 or state regulation, cumulative loading records should be kept and can be calculated with the following formula:

Metal concentration in biosolids (mg/kg) x dry tons applied per acre/500 = lbs metal/acre + Previous total = cumulative metals loading in lbs/acre

## **Contract Administration**

Exhibit A is an example contract that agencies can consider when establishing their biosolids contracts. Note that this example references a majority of the regulations but is not meant to be a comprehensive list of all applicable regulations. The purpose of the example language is to draw awareness and make sure the handling party acknowledges the vast array of regulations that may apply.

Land application contracts should detail the Contractor's responsibilities with respect to the land application program. This includes but is not limited to the following:

1. General compliance with and understanding of the pertinent regulations, including but not limited to 40 CFR 503, the State General Order, CARB's ACF regulations, and any relevant county ordinances that impact land application activities. If the contractor is responsible for both hauling and land application, additional regulations pertaining to hauling (e.g. maximum weights) will apply.
2. Communication with the landowners: Per 40 C.F.R. 503.12(h), the land applier is required to provide the owner or lease holder of the fields with key information related to the operation. In the land application contract, this responsibility should be made clear, along with a requirement to copy the Agency on the communication to the owner or lease holder. A regulatory citation for inclusion in the contract is provided in the example.
3. Hauling: The contract should require the Contractor to provide driver information packets containing information in case of a spill or public inquiry. Such packets typically include the Agency's biosolids fact sheet, or Safety Data Sheet, a spill response plan, and list of emergency contacts. It is recommended that the Agency's emergency contact (often Operations Central Control) be included in the list of emergency contacts so that the Agency is notified in the event of a spill.
4. Reporting: The Contractor must provide the Agency with information sufficient for completion of the EPA Annual Report and quarterly AB 901 reports. In some cases, the Contractor collects compliance samples (e.g. heavy metals, nutrients) on behalf of the Agency – this should be specified in the contract. Monthly and Quarterly reports (if applicable) should be submitted within 30 days of the reporting period. Additional information to be provided to the Agency includes field location, application rate, and crop grown. The contract should specify the date by which such information should be provided (usually year end, or with sufficient time to submit the Annual Report in February). The Contractor should notify the Agency within 24 hours after receiving any notice of violation, legal, or enforcement action.

## EXHIBIT A – EXAMPLE AGREEMENT LANGUAGE

### BIOSOLIDS MANAGEMENT AGREEMENT BETWEEN POTW X AND CONTRACTOR Y

#### I. OVERVIEW

By entering into this Agreement, Contractor certifies that it will comply with all applicable federal, state, county, and local laws, rules, and regulations relating to land application of biosolids. Contractor acknowledges that both it and the [name of POTW] are subject to the requirements of [40 C.F.R. §§ 503](#), which defines the federal standards, practices, and legal requirements for beneficial use of biosolids through placement in or on soil; as well as related state and local requirements. Contractor certifies that it has reviewed, is familiar with, and understands all applicable standards for the use or disposal of biosolids, including without limitation the requirements of 40 C.F.R. §§ 503, Subparts B and D, the requirements identified in the [name of POTW]'s permit(s) (as defined by 40 C.F.R. § 503.3), and the specific standards, requirements, and guidance materials identified below. The [name of POTW] acknowledges its responsibility in ensuring compliance with the same federal, state, and local regulations and this contract does not obviate that responsibility.

#### II. CERTIFICATIONS, ACKNOWLEDGMENTS, AND CONTRACTOR RESPONSIBILITIES

By entering into this Agreement, Contractor certifies that the [name of POTW] has provided it with the information necessary to comply with the requirements of 40 C.F.R. §§ 503, Subpart B, as well applicable state and local requirements.

##### A. Federal Requirements Applicability

- Contractor acknowledges that 40 C.F.R. §§ 503, Subpart B applies to any person who prepares sewage sludge that is applied to the land, to any person who applies sewage sludge to the land, to sewage sludge applied to the land, and to the land on which sewage sludge is applied.  
Land Application Standards and Practices
- Contractor certifies that it has reviewed and understands the special definitions provided in [40 C.F.R. § 503.11](#).
- Contractor certifies that it has reviewed, understands, and will comply with the land application requirements identified in [40 C.F.R. § 503.12](#), including without limitation the requirement that the person who applies sewage sludge to the land shall obtain information needed to comply with the requirements of 40 C.F.R. §§ 503, Subpart B.
- Contractor certifies that it has reviewed, understands, and will comply with the management practices identified in [40 C.F.R. § 503.14](#).
- Contractor certifies that it has reviewed, understands, and will comply with the management practices for Class B biosolids identified in 40 C.F.R. Section 503.32(b)(5).  
Provision of Required Information to Site Owner
- Contractor certifies that it shall provide the owner or lease holder of the land on which the biosolids are applied notice and all necessary information to comply with the requirements 40 C.F.R. §§ 503, Subpart B, pursuant to [40 C.F.R. § 503.12\(h\)](#).  
Guidance Materials

- Contractor certifies that it has reviewed, understands, and will comply with the management and practices guidance provided by the Environmental Protection Agency (“EPA”) in the following [documents about land application of biosolids](#), consistent with the requirements of 40 C.F.R. §§ 503, Subpart B:
  - [Fact Sheet: Land Application of Biosolids](#)
  - [A Guide for Land Appliers on the Requirements of the Federal Standards for the Use or Disposal of Sewage Sludge, 40 CFR Part 503](#)
  - [Process Design Manual: Land Application of Sewage Sludge and Domestic Septage](#)
- Contractor certifies that it has reviewed, understands, and will comply with the regulatory guidance provided by the EPA in the following documents, consistent with the requirements of 40 C.F.R. §§ 503, Subpart B:
  - [Federal Register: Standards for the Use or Disposal of Sewage Sludge; pp. 9360-9363](#)
  - [A Plain English Guide to the EPA Part 503 Biosolids Rule](#)
- Contractor certifies that it will obtain and familiarize itself with future regulatory, management, and practices guidance offered by EPA, as well as other pertinent industry materials relating to regulatory requirements for land application of biosolids, on an ongoing basis.

B. State and Local Requirements

Contractor certifies that it will comply with all applicable state, county, and local laws, rules, and regulations relating to land application of biosolids in the jurisdictions in which Contractor applies biosolids obtained from the [name of POTW], including future laws, rules, and regulations not yet in effect. The following sections identify the state and local requirements that are applicable to biosolids land application sites planned to be used by the Contractor. The sections below do not encompass the jurisdictions of sites not yet proposed to [insert name of POTW] by the Contractor. Contractor certifies that should additional sites with different jurisdictions be proposed in the future pursuant to this Agreement—or if the jurisdictions in which Contractor currently applies biosolids implement new or additional requirements—it will comply with all applicable state, county, and local laws, rules, and regulations relating to land application of biosolids in those jurisdictions.

State Water Resources Control Board General Order

Contractor certifies that it has reviewed, understands, and will comply with the land application requirements identified in State Water Resources Control Board Water Quality Order [No. 2004-0012-DWQ](#) “General Waste Discharge Requirements for the Discharge of Biosolids to Land for use as a Soil Amendment in Agricultural, Silvicultural, Horticultural, and Land Reclamation Activities (General Order - GO)”. The General Order uses the 40 CFR Part 503 requirements as baseline requirements for compliance. It provides additional requirements, as well as permitting and oversight. A Regional Water Quality Control Board may choose not to issue the General Order in cases where a local agency already adequately regulates the activity or if it issues a site-specific Waste Discharge Requirement (WDR) permit. Thus, the General Order may not apply to all biosolids land application practices in California, but the contractor shall determine

applicability and comply with all necessary requirements of the GO or the WDR as well as any local requirements.

#### California Air Resources Board Advanced Clean Fleet Regulations

While <name of POTW> works with <Contractor> to identify the final destination for hauling and ensure the solids/biosolids are beneficially used or disposed of as agreed upon in this contract, this contract does not dictate or direct the day-to-day operational decisions of <Contractor's> hauling service from <facility name> to <land application site or facility where additional processing takes place or landfill>. Thus, <Contractor> is not subject to Section 2013 of the CARB ACF regulations that govern the <name of POTW> medium- to heavy-duty fleet vehicles of gross vehicle weight rating (GVWR) >8,500 lbs. However, per Section 2013(j), the hired entity must provide documentation showing fleet compliance (including record keeping) because any vehicles with a GVWR > 8,500 lbs and light-duty package delivery vehicles operated in California may be subject to the CARB ACF regulations. Such vehicles may therefore be subject to requirements to reduce emissions of air pollutants. For more information, please visit the CARB ACF website at <https://ww2.arb.ca.gov/our-work/programs/advanced-clean-fleets>.

### **III. [NAME OF POTW] RESPONSIBILITIES AND OVERSIGHT**

By entering into this agreement, the [name of POTW] acknowledges it has properly treated biosolids to meet the requirements of subparts B and D of 40 C.F.R. part 503. The [name of POTW] certifies that it understands all of the requirements of 40 CFR part 503 that is required of the Contractor. The [insert name of POTW] certifies that it will observe the Contractor's operations and land application activities as appropriate. Such observations may be announced or unannounced in advance. The [name of POTW] will receive and review the Contractor's land application protocols, including how application rates are set and achieved. One means of calculation the application rate (based on Wisconsin DNR Form 3400-054) is as follows (this should be close to what the Contractor calculates):

- a. Determine the recommended pounds per acre of Nitrogen for each crop type.
- b. Subtract the pounds per acre of other sources of nitrogen the farmer will apply to determine the number of pounds per acre of Nitrogen needed and to be supplied by the biosolids. This will equal A.
- c. Multiply the percent dry weight of Ammonium Nitrogen (NH<sub>4</sub>) by 20 if the biosolids will be incorporated/injected or by 10 if the biosolids will be surface applied. This will equal B expressed in pounds per dry ton.
- d. Subtract Ammonium Nitrogen (NH<sub>4</sub>) from Total Kjeldahl Nitrogen (TKN). This will equal Organic Nitrogen expressed as a percent dry weight.
- e. Multiply Organic Nitrogen by 5. This will equal C expressed in pounds per dry ton, and assumes a 25% mineralization rate.
- f. Add B and C to calculate D.
- g. Divide A by D to calculate E, which is the recommended biosolids application rate expressed in dry tons per acre.
- h. Divide E by the biosolids percent total solids and multiply by 119. This will equal the application rate in cubic yards per acre.