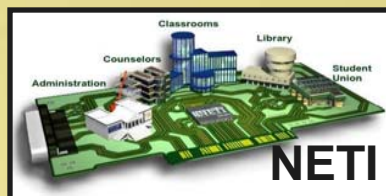




Inaugural CWA-NPDES National Technical Inspector Workshop

US EPA National Enforcement Training Institute
Lakewood, Colorado
February 28th - March 2nd 2006



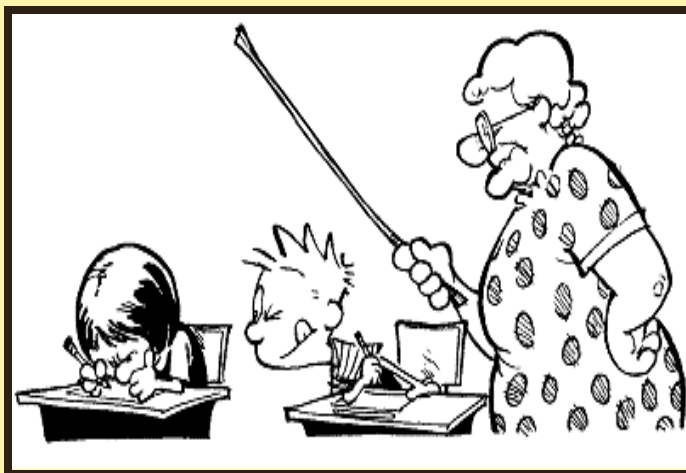
40 CFR Part 503 Requirements & Biosolids Inspection

Wesley Carr, Environmental Protection Specialist
Colorado Department of Public Health & Environment
Water Quality Control Division



What We Will Cover

- 40 CFR Part 503 “*The Standards for the Use or Disposal of Sewage Sludge*”
 - Background
 - Risk Assessment Basis
 - Brief Overview of the Rule
 - Detailed Requirements for the Treatment & Land Application of Biosolids
 - Overview of the 503-based Inspection Forms
 - Discussion





Background 503 Rule

- As Required by the Clean Water Act
 - EPA developed the 40 CFR Part 503 Rule to protect public health and the environment from any reasonably anticipated adverse effects of certain pollutants that might be present in sewage sludge/biosolids
 - Biosolids are a primarily organic solid product produced by wastewater treatment processes that can be beneficially recycled (or disposed of)
 - Sewage Sludge vs. Biosolids (untreated vs. treated)
 - Part 503 establishes requirements for the final use and disposal of sewage sludge/biosolids when:
 - Biosolids are applied to the land for beneficial use (soil conditioner/fertilizer)
 - Placed on a surface disposal site for final disposal
 - Fired in an incinerator



Risk Assessment

- Many of the requirements of the 503 Rule are based on the results of an extensive multimedia risk assessment:
 - 25 pollutants were addressed
 - 14 exposure pathways
- Concurrently, EPA developed a new methodology that provided for the protection of the environment and public health
- This methodology was reviewed and approved by EPA's Science Advisory Board
- Most recently, it was concluded that more research is needed
- However, there is no evidence that we have failed to protect the public health and environment
- From these observations, one might conclude that biosolids may be safely recycled when treated and used as prescribed in the 503 Rule



40 CFR Part 503 Overview

- 5 Subparts to Part 503 (parts is parts)
 - Subpart A – general provisions, applicability, purpose, etc.
 - **Subpart B – requirements for land application (beneficial use)**
 - Subpart C – requirements for surface disposal
 - **Subpart D – requirements for Pathogen and Vector Attraction Reduction (treatment)**
 - Subpart E – incineration requirements
- Applicability
 - Any person who:
 - Land applies - biosolids
 - Land disposes – biosolids/sewage sludge
 - Incinerates – biosolids/sewage sludge
- Part 503 is Self-Implementing
 - Persons are required to follow the rule even if they have not been issued a permit for such activities...EPA can take enforcement actions against persons who violate the Part 503 requirements (permitted or not)



Biosolids Classification & Use

- **Metals Based**
 - Table I Limits
 - Table III Limits
- **Vector Attraction Reduction (VAR)**
 - Treatment at the Facility
 - Providing a Soil-Barrier at the Site
- **Pathogen Destruction Criteria**
 - Class A
 - Class B

MVP





METALS LIMITS

Maximum Concentration mg/kg dry weight	Table III Metals Lower Concentrations	Table I Metals Ceiling Concentration
Arsenic	41	75
Cadmium	39	85
Copper	1500	4300
Lead	300	840
Mercury	17	57
Molybdenum	N/A	75
Nickel	420	420
Selenium	100	100
Zinc	2800	7500



Pathogen Destruction Criteria



Class A Biosolids*

OR

Class B Biosolids*

***with respect to pathogens**



Class "A" With Respect to Pathogens

Fecal < 1000 MPN/g or Salmonella s.p. < 3 MPN/4g (based on seven individual samples per event)

AND

Use one of 5 approved methods to Further Reduce Pathogens:

- Time/temp depending on solids content
- pH/time then dry to at least 50% solids
- Testing for enteric viruses/viable helminth ova
- Testing for reduction of these analytes
- **PFRP**: composting, heat drying, heat treatment, TAD, beta ray irradiation, gamma ray irradiation, pasteurization, other methods as approved by the permitting authority



Class "B" With Respect to Pathogens

7 samples - Geometric Mean <2,000,000 MPN/g or CFU (based on seven samples per event)

OR

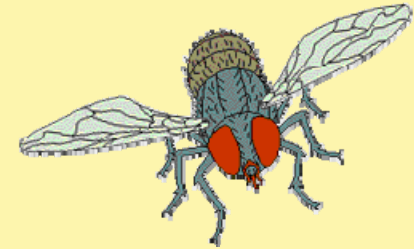
Use 1 of 5 Approved **PSRP** methods:

- Aerobic Digestion: 40 days @ 20 °C no less than 60 days @15 °C
- Air Drying: 3 months with two months above 0 °C
- Anaerobic Digestion: 15 days @ 35-55 °C no less than 60 days at 20 °C
- Composting: Minimum 40 °C for 5 days with min 4 hours at 55 °C
- Lime Stabilization: Add lime to raise pH to 12 after two hours of contact
- Other as approved by the permitting authority



Vector Attraction Reduction (VAR)

- (1) 38% VSR
- (2) Anaerobic - bench scale test (40 days)
- (3) Aerobic - bench scale test (30 days)
- (4) Aerobic - SOUR ≤ 1.5 mg O₂/hr @ 20 °C
- (5) Aerobic - 14+ days @ >40 °C (avg >45 °C)
- (6) pH \wedge 12+ for 2 hr then 11.5+ for 22hr
- (7) Dry to 75% when stabilized solids used (digested)
- (8) Dry to 90% when unstabilized solids used (undigested)
- (9) Sub. injection (no significant after 1hr)
- (10) Surface application w/incorporation (w/in 6hrs)





Distribution & Marketing

- **Class A Unrestricted Use (lawn & garden)**

- Table III Metals
- Exceptional Quality (EQ)



- **Class A Restricted Use (containerized or bulk)**

- Table I Metals - Pollutant Concentration
- Subject to APLR – Annual Pollutant Loading Rate



- **Class B Restricted Use – (agricultural)**

- Table III Metals – Pollutant Concentration (PC)
- Table I Metals Subject to CPLR – Cumulative Pollutant Loading Rate





Class "A" Unrestricted Use

Bulk or Containerized Biosolids for Lawn and Home Garden Use



- **Must meet Table III Metals**
- **Must meet Class A Pathogen Criteria**
- **Must meet one of the VAR options 1 thru 8 for TREATMENT**



Class "A" Restricted Use

Bulk or Containerized Biosolids for Lawn and Home Garden Use



- **Exceed Table III Metals Limits (still within Table I)**
- **Must meet Class A Pathogen Criteria**
- **Must meet one of the VAR for TREATMENT**
- **Subject to Annual Pollutant Loading Limits (APLR)**



Annual Pollutant Loading Limits (APLR)

kg/ha (lbs/Ac)

Arsenic	2 (1.79)
Cadmium	1.9 (1.7)
Copper	75 (66.94)
Lead	15 (13.39)
Mercury	.85 (.76)
Nickel	21 (18.74)
Selenium	5 (4.46)
Zinc	140 (124.96)





Land Application

Bulk Biosolids for Agricultural or Land Reclamation Use



- **Must meet Table I Metals**
- **Must meet either Class A or Class B**
- **Must meet one of the VAR Options**
- **Table I Metals subject to Cumulative Pollutant Loading Limits**
- **No land application if metals exceed Table I limits**



Cumulative Pollutant Loading Limits

kg/ha (lbs/Ac)

Arsenic	41 (37)
Cadmium	39 (35)
Copper	1500 (1339)
Lead	300 (268)
Mercury	17 (15)
Nickel	420 (375)
Selenium	100 (89)
Zinc	2800 (2499)





Class B Crop Harvesting Restrictions

- **Food crops with harvested parts that touch biosolids or grow above surface – 14 months**



- **Food crops with harvested parts below surface and biosolids remain on surface for 4 months prior to incorporation – 20 months**



- **Food crops with harvested parts below surface and biosolids remain on surface for less than 4 months prior to incorporation – 38 months**



- **Food, feed and non-food crops – 30 days**





Class B Site Restrictions

- No domestic livestock grazing for 30 days after application



- Turf may not be harvested for 1 yr



- High public exposure sites - limit access for 1 yr



- Low public exposure sites – limit access for 30 days





Other Requirements & Management Practices

- Agronomic Rate – apply biosolids at or below agronomic rate
 - Unless another rate is approved by the permitting authority
- Endangered Species – no application adverse affects are likely
- Flooded, Frozen or Snow-Covered Land – not prohibited by Part 503 but appliciers must ensure the solids do not enter surface waters or wetlands
- U.S. Waters – no application within 33 feet unless otherwise specified by the permitting authority



Monitoring & Analysis

Biosolids Frequency of Sampling & Analysis

Annual Production DST/YR	Frequency
Less than 319	Once per year collected during 4 th QTR
319 to 1,649	Once per quarter
1,650 to 16,499	Once per two months
16,500 +	Monthly
Lagoons	Prior to removal





Record Keeping



- **Preparers & Appliers must develop and maintain the following information for 5 years:**
 - **Documentation demonstrating compliance with Pathogen Destruction, VAR and Metals Criteria**
 - **Certification Statements**
 - **Results of Biosolids and Soils Analysis**



Inspection Tools: 503-Based Forms



BIOSOLIDS FACILITY INSPECTION FORM

Biosolids Management Program (WQCD-P-B2)
4300 Cherry Creek Drive South
Denver, CO 80126-1530
Phone (303) 692-3613 Fax (303) 782-0390 E-mail: biosolids@state.co.us

GENERAL FACILITY INFORMATION

Date _____ Inspector _____
 Facility Name _____ Method of Solids Disposal:
 Beneficial Use (Land Application)
 Agricultural Land
 Other _____ %
 CDPHS Discharge Permit # CO _____ Contractor: _____
 Frequency: Daily Weekly Monthly
 Facility Contact _____
 Public Distribution
 Other _____ %
 Title _____ Phone _____
 Surface Disposal CD# _____
 Landfill Name: _____
 Transferred to Other Facility
 Other _____
 E-mail _____ Solids storage capacity (days) _____

RECORDKEEPING AND REPORTING INFORMATION

Yes No Are records available for beneficial use or disposal practices for the past 5 years?
 Yes No Are Pathogen Reduction, Vector Attraction Reduction and Metals records available for the past 5 years?
 Yes No Are field application records and soil analysis records available for the past 5 years?
 Yes No Is a list of current biosolids application sites and locations available at the facility?

PATHOGEN DESTRUCTION INFORMATION

Testing
 Fecal Coliform MPN or CFU (Circle One)
 Salmonella
 E. coli
 Sampling Location (please attach WWTP schematic)
 Time Temperature - Batch Continuous
 Where are Temperature Readings Obtained: _____

VECTOR ATTRACTION REDUCTION INFORMATION

Yes No Are Vector Attraction Reduction Requirements met at the facility? Method _____
 For VSR:
 Sample Locations (VSR) In: _____ Out: _____
 Show Equation used _____

Facility Representative _____ CDPHE Inspector _____
 Signature _____ Date _____ Signature _____ Date _____



BIOSOLIDS MANAGEMENT PROGRAM WATER QUALITY CONTROL DIVISION (WQCD-P-B2) 4300 Cherry Creek Drive South - Denver, CO 80246-1530 303-692-3613 - www.cdphe.state.co.us - Fax 303-782-0390

BIOSOLIDS PREPARER AUDIT FORM

(Please see instructions for completing this form on the back of this page)

GENERAL INFORMATION

Date _____ Time In _____ Time Out _____ Reason for Audit: Routine Complaint
 Facility Name _____ Type of Facility:
 Approved Pre-treatment Program
 POTW Flow \geq 1 MGD
 Domestic Wastewater Treatment Works \geq 2000 GPD
 Other _____
 Reuse Effluent (other than at facility)
 Mailing Address _____
 E-mail _____
 Contact Title _____ Method of Solids Disposal:
 Land Application (beneficial use)
 Bulk Ag Land _____ %
 Compost _____ %
 Other _____ %
 Phone _____
 Surface Disposal CD
 Landfill CD _____
 Transferred to Another Facility
 Facility _____
 Other _____
 Discharge Permit # CO _____
 EPA Region 8 Biosolids Permit # CO _____
 Auditor _____

PERMIT VERIFICATION

Y/N/N/A 1. Are 40 CFR Part 503 sludge use and disposal requirements contained in:
 NPDES Permit?
 NPDES Sludge Only Permit?
 EPA REGION 8 General Permit?
 EPA Region 8 Individual Permit?
 RCRA Subtitle C permit? Effective date(s) of applicable permit _____
 2. Annual Sludge Production _____ (mt/yr, T/yr) [last calendar year]
 Y/N/N/A 3. Are number and location of disposal sites/activities described in permit or approved management plan?

RECORDKEEPING AND REPORTING EVALUATION

Y/N/N/A 4. Are records available for all use or disposal practices?
 Y/N/N/A 5. Are the number and location of sludge disposal sites available? (i.e., location maps)
 Y/N/N/A 6. Are self-monitoring data available for all regulated pollutants?
 Y/N/N/A 7. Are Pathogen and Vector Attraction Reduction method descriptions and certification statements available?
 Y/N/N/A 8. Are accurate records of sludge volume or mass maintained, where appropriate?
 Y/N/N/A 9. Are self-monitoring activities conducted at required frequencies? (See Figure-1 on back of this page)

WC Version 1 - 7/03



BIOSOLIDS LAND APPLICATION INSPECTION FORM

Biosolids Management Program (WQCD-P-B2)
4300 Cherry Creek Drive South
Denver, CO 80126-1530
Phone (303) 692-3613 Fax (303) 782-0390 E-mail: biosolids@state.co.us

0152

GENERAL SITE INFORMATION

Date _____ Time _____ am _____ pm
 Reason for Inspection: Routine Complaint (attach CRTS)
 Other _____
 Inspector _____
 Organization _____
 CDPHE BMP# _____
 Permittee _____
 Permittee Site ID _____
 Location (from nearest major intersection) _____
 County _____
 Application Observation Area GPS Reading:
 North _____° _____' _____" West _____° _____' _____"
 Type of Application:
 Agricultural Reclamation Other _____
 Liquid Cake Other _____
 Weather:
 Sunny Partly Cloudy Cloudy Overcast Stormy
 Calm Breeze Windy Drizzle
 Drizzle Rain Cloudburst Snow
 Temperature (°F):
 <32 32 - 40 40 - 60 60 - 80 >80
 Humidity:
 Dry Moderate Humid
 Field Conditions:
 Bare Stable Planted Rangeland
 Dry Moist Wet Muddy Saturated Ponding
 Not-Frozen Frost Frozen Snow-Covered
 Nearby Residence: Yes Distance _____' Direction _____
 No
 Odor: None Mild Moderate Strong

RECORDKEEPING REPORTING INFORMATION

NOA Date: _____ Variance Issued: Yes (explain) _____ No
 Special Conditions: Yes (explain) _____ No
 Nutrient Analysis After Last Crop and Prior to Application: Yes Date: _____ ID: _____ No
 Soil Metals Analysis Within 5 years: Yes Date: _____ ID: _____ No
 CDPHE Notified of Application: Yes No County Health Notified of Application: Yes No
 Original Owner: Yes No Original Farmer: Yes No Original Legal Contact: Yes No
 Original Biosolids Source: Yes No Current Biosolids Management Plan: Yes No

FOR CDPHE USE ONLY

Follow-Up: Yes Date: _____ No NOA Valid: Yes No LRI Assessment Required: Yes No
 CA: Yes Date: _____ No NOV: Yes Date: _____ No Enforcement Refused Date: _____

White - CDPHE Yellow - Inspector Pink - Site Representative Goldendust - Facility



Discussion