

**Document 04.4 Biosolids Products/Compliance Parameters**

Version Number: 1  
 Version Date: October 13, 2011

Product	Usage	Compliance Parameters	Operational Controls																				
Centrifuge Cake (25% solids)	Land application	Metal Concentrations < Table 3 of 40 CFR 503.13 <table border="1"> <thead> <tr> <th>Pollutant</th> <th>Monthly Ave Conc. (mg/kg)</th> </tr> </thead> <tbody> <tr> <td>As</td> <td>&lt; 41</td> </tr> <tr> <td>Cd</td> <td>&lt; 39</td> </tr> <tr> <td>Cu</td> <td>&lt; 1500</td> </tr> <tr> <td>Pb</td> <td>&lt; 300</td> </tr> <tr> <td>Hg</td> <td>&lt; 17</td> </tr> <tr> <td>Mo</td> <td>&lt; 75</td> </tr> <tr> <td>Ni</td> <td>&lt; 420</td> </tr> <tr> <td>Se</td> <td>&lt; 100</td> </tr> <tr> <td>Zn</td> <td>&lt; 2800</td> </tr> </tbody> </table>	Pollutant	Monthly Ave Conc. (mg/kg)	As	< 41	Cd	< 39	Cu	< 1500	Pb	< 300	Hg	< 17	Mo	< 75	Ni	< 420	Se	< 100	Zn	< 2800	MWRDGC Pretreatment/Enforcement Program
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**Environmental Management System for Biosolids**

		<p>Vector Attraction Reduction = VAR requirements of 40 CFR 503.33(b)(1) through (b)(10).</p> <p>40 CFR 503.33(b)(10)</p> <p>Incorporation into soil within 6 hours after application to or placement on the land.</p>	<ul style="list-style-type: none"> <li>• Incorporation</li> </ul>
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Aged Cake (65% solids)	Land Application  Controlled Solids Distribution	<p>Metal Concentrations &lt; Table 3 of 40 CFR 503.13</p> <table border="1"> <thead> <tr> <th>Pollutant</th> <th>Monthly Ave Conc. (mg/kg)</th> </tr> </thead> <tbody> <tr> <td>As</td> <td>&lt; 41</td> </tr> <tr> <td>Cd</td> <td>&lt; 39</td> </tr> <tr> <td>Cu</td> <td>&lt; 1500</td> </tr> <tr> <td>Pb</td> <td>&lt; 300</td> </tr> <tr> <td>Hg</td> <td>&lt; 17</td> </tr> <tr> <td>Mo</td> <td>&lt; 75</td> </tr> <tr> <td>Ni</td> <td>&lt; 420</td> </tr> <tr> <td>Se</td> <td>&lt; 100</td> </tr> <tr> <td>Zn</td> <td>&lt; 2800</td> </tr> </tbody> </table>	Pollutant	Monthly Ave Conc. (mg/kg)	As	< 41	Cd	< 39	Cu	< 1500	Pb	< 300	Hg	< 17	Mo	< 75	Ni	< 420	Se	< 100	Zn	< 2800	MWRDGC Pretreatment/Enforcement Program
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**Environmental Management System for Biosolids**

		<p>Pathogens = Class A Requirements of 40 CFR 503.32(a)(8)(ii) – Process Equivalent to a Process to Further Reduce Pathogens (PFRP)</p> <ol style="list-style-type: none"> <li>1. Anaerobic Digestion: 20 days average detention time @ 35°+ 2°C</li> <li>2. Centrifuge to 20 to 30% solids</li> <li>3. Lagoon Aging of cake a minimum of 1.5 years</li> <li>4. Air-drying of cake: application ≤ 410 dt/acre                      ≤ 18 inches depth                      agitate an average of 3x/wk                      achieve ≥60% solids</li> </ol> <p style="text-align: center;">-OR-</p> <p style="text-align: center;">fecal coliform &lt; 1000 MPN per gram, or                      Salmonella sp. Bacteria &lt; 3 MPN per 4 grams                      Enteric viruses &lt; 1 PFU per 4 grams                      Helminth ova &lt; 1 per 4 grams</p>	<ul style="list-style-type: none"> <li>• Digester time/temperature</li> <li>• Centrifuge SOP</li> <li>• Lagoon Holding Time</li> <li>• Lagoon SOP</li> <li>• Air Drying Time</li> <li>• # of agitations</li> <li>• Air Drying SOP</li> <li>• PFRP Protocol</li> </ul>
<p>Aged Cake (65% solids) (cont')</p>	<p>Land Application  Controlled Solids Distribution (cont')</p>	<p>Vector Attraction Reduction = VAR requirements of 40 CFR 503.33(b)(1) through (b)(10).</p> <p><u>40 CFR 503.33(b)(1)</u>                      ≥38% volatile solids reduction</p> <p><u>40 CFR 503.33(b)(2)</u>                      Digest previously digested sludge anaerobically in the lab in a bench scale unit for 40 additional days @ a temp between 30 and 35°C. Volatile solids reduction is achieved if &lt; 17%</p> <p><u>40 CFR 503.33(b)(10)</u>                      Incorporation into soil within 6 hours after application to or placement on the land.</p>	<ul style="list-style-type: none"> <li>• Digester time/temperature</li> <li>• Lagoon Holding Time</li> <li>• Air Drying Time</li> <li>• Incorporation</li> </ul>

**Environmental Management System for Biosolids**

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Aged Lo-Solids (65% solids)	Land Application  Controlled Solids Distribution	Metal Concentrations < Table 3 of 40 CFR 503.13 <table border="1"> <thead> <tr> <th><u>Pollutant</u></th> <th><u>Monthly Ave Conc. (mg/kg)</u></th> </tr> </thead> <tbody> <tr><td>As</td><td>&lt; 41</td></tr> <tr><td>Cd</td><td>&lt; 39</td></tr> <tr><td>Cu</td><td>&lt; 1500</td></tr> <tr><td>Pb</td><td>&lt; 300</td></tr> <tr><td>Hg</td><td>&lt; 17</td></tr> <tr><td>Mo</td><td>&lt; 75</td></tr> <tr><td>Ni</td><td>&lt; 420</td></tr> <tr><td>Se</td><td>&lt; 100</td></tr> <tr><td>Zn</td><td>&lt; 2800</td></tr> </tbody> </table>	<u>Pollutant</u>	<u>Monthly Ave Conc. (mg/kg)</u>	As	< 41	Cd	< 39	Cu	< 1500	Pb	< 300	Hg	< 17	Mo	< 75	Ni	< 420	Se	< 100	Zn	< 2800	MWRDGC Pretreatment/Enforcement Program
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Pathogens = Class A Requirements of 40 CFR 503.32(a)(8)(ii) – Process Equivalent to a Process to Further Reduce Pathogens (PFRP) <ol style="list-style-type: none"> <li>Anaerobic Digestion: 20 days average detention time @ 35°+ 2°C</li> <li>Lagoon Aging of lo-solids a minimum of 1.5 years</li> <li>Air-drying of cake: application ≤ 230 dt/acre                          ≤ 15 inches depth                          agitate an average of 3x/wk                          achieve ≥60% solids</li> </ol> <p style="text-align: center;">-OR-</p> fecal coliform < 1000 MPN per gram, or Salmonella sp. Bacteria < 3 MPN per 4 grams Enteric viruses < 1 PFU per 4 grams Helminth ova < 1 per 4 grams	<ul style="list-style-type: none"> <li>Digester time/temperature</li> <li>Centrifuge SOP</li> <li>Lagoon Holding Time</li> <li>Lagoon SOP</li> <li>Air Drying Time</li> <li># of agitations</li> <li>Air Drying SOP</li> <li>PFRP Protocol</li> </ul>																						



**Environmental Management System for Biosolids**

<p>Aged Lo-Solids (65% solids) (cont')</p>	<p>Land Application  Controlled Solids Distribution (cont')</p>	<p>Vector Attraction Reduction = VAR requirements of 40 CFR 503.33(b)(1) through (b)(10).  40 CFR <u>503.33(b)(1)</u> ≥38% volatile solids reduction 40 CFR <u>503.33(b)(2)</u> Digest previously digested sludge anaerobically in the lab in a bench scale unit for 40 additional days @ a temp between 30 and 35°C. Volatile solids reduction is achieved if &lt; 17% 40 CFR <u>503.33(b)(10)</u> Incorporation into soil within 6 hours after application to or placement on the land.</p>	<ul style="list-style-type: none"> <li>• Digester time/temperature</li> <li>• Incorporation</li> <li>• Lagoon Holding Time</li> <li>• Air Drying Time</li> </ul>
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**Environmental Management System for Biosolids**

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Anaerobically Digested Biosolids (Hanover Park)	Land application	Metal Concentrations < Table 3 of 40 CFR 503.13 <table border="1"> <thead> <tr> <th>Pollutant</th> <th>Monthly Ave Conc. (mg/kg)</th> </tr> </thead> <tbody> <tr> <td>As</td> <td>&lt; 41</td> </tr> <tr> <td>Cd</td> <td>&lt; 39</td> </tr> <tr> <td>Cu</td> <td>&lt; 1500</td> </tr> <tr> <td>Pb</td> <td>&lt; 300</td> </tr> <tr> <td>Hg</td> <td>&lt; 17</td> </tr> <tr> <td>Mo</td> <td>&lt; 75</td> </tr> <tr> <td>Ni</td> <td>&lt; 420</td> </tr> <tr> <td>Se</td> <td>&lt; 100</td> </tr> <tr> <td>Zn</td> <td>&lt; 2800</td> </tr> </tbody> </table>	Pollutant	Monthly Ave Conc. (mg/kg)	As	< 41	Cd	< 39	Cu	< 1500	Pb	< 300	Hg	< 17	Mo	< 75	Ni	< 420	Se	< 100	Zn	< 2800	MWRDGC Pretreatment/Enforcement Program
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Vector Attraction Reduction = VAR requirements of 40 CFR 503.33(b)(1) through (b)(10).  40 CFR 503.33(b)(1): Volatile solids reduction in sewage sludge must be ≥ 38%.	<ul style="list-style-type: none"> <li>Digester Time/Temperature</li> <li>Lagoon Holding Time</li> </ul>																						

**Environmental Management System for Biosolids**

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Adjusted Standard (AS) 95-4/03-02 (60% solids)	Final Cover	Metal Concentrations < Table 3 of 40 CFR 503.13 <table border="1"> <thead> <tr> <th>Pollutant</th> <th>Monthly Ave Conc. (mg/kg)</th> </tr> </thead> <tbody> <tr> <td>As</td> <td>&lt; 41</td> </tr> <tr> <td>Cd</td> <td>&lt; 39</td> </tr> <tr> <td>Cu</td> <td>&lt; 1500</td> </tr> <tr> <td>Pb</td> <td>&lt; 300</td> </tr> <tr> <td>Hg</td> <td>&lt; 17</td> </tr> <tr> <td>Mo</td> <td>&lt; 75</td> </tr> <tr> <td>Ni</td> <td>&lt; 420</td> </tr> <tr> <td>Se</td> <td>&lt; 100</td> </tr> <tr> <td>Zn</td> <td>&lt; 2800</td> </tr> </tbody> </table>	Pollutant	Monthly Ave Conc. (mg/kg)	As	< 41	Cd	< 39	Cu	< 1500	Pb	< 300	Hg	< 17	Mo	< 75	Ni	< 420	Se	< 100	Zn	< 2800	<ul style="list-style-type: none"> <li>Pretreatment/Enforcement Program</li> </ul>
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Adjusted Standard Protocol	<ol style="list-style-type: none"> <li>Anaerobic Digestion @ 35-55° C for a minimum of 15 days or longer with digestion times and temps managed so as to ensure that the District's anaerobically digested product is consistent with the USEPA's pathogen treatment requirements for a Class B sludge (40 CFR 503, Appendix B(A)(3))</li> <li>Storage in lagoons for &gt; 1-1/2 years after the final addition of sludge; and</li> <li>Air drying for 4 weeks minimum, or as necessary to achieve 60% solids.</li> </ol>	<ul style="list-style-type: none"> <li>Digester Time/Temperature</li> <li>AS 95-4/03-02 SOPs</li> <li>Lagoon holding time</li> <li>Air drying time</li> </ul>																					

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Unaged Cake or Lo-Solids (65% solids)	Daily Cover	Metal Concentrations < Table 3 of 40 CFR 503.13 <table border="1"> <thead> <tr> <th>Pollutant</th> <th>Monthly Ave Conc. (mg/kg)</th> </tr> </thead> <tbody> <tr><td>As</td><td>&lt; 41</td></tr> <tr><td>Cd</td><td>&lt; 39</td></tr> <tr><td>Cu</td><td>&lt; 1500</td></tr> <tr><td>Pb</td><td>&lt; 300</td></tr> <tr><td>Hg</td><td>&lt; 17</td></tr> <tr><td>Mo</td><td>&lt; 75</td></tr> <tr><td>Ni</td><td>&lt; 420</td></tr> <tr><td>Se</td><td>&lt; 100</td></tr> <tr><td>Zn</td><td>&lt; 2800</td></tr> </tbody> </table>	Pollutant	Monthly Ave Conc. (mg/kg)	As	< 41	Cd	< 39	Cu	< 1500	Pb	< 300	Hg	< 17	Mo	< 75	Ni	< 420	Se	< 100	Zn	< 2800	MWRDGC Pretreatment/Enforcement Program
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<p><u>40 CFR Part 258.21(a) and (b) – Cover Material Requirements:</u> Use of an alternative material to the earthen material specified in (a) must be approved by the IEPA if it is demonstrated that the alternative material controls disease vectors, fires, odors, blowing litter and scavenging.</p> <p><u>IAC Section 811.106 – Daily Cover:</u> Use of an alternative material to the clean soil material specified in a) provided the material is equivalent to clean soil material in the following area: 1) prevention of blowing debris; 2) minimization of access to the waste by vectors; 3) minimization of the threat of fires at the open face; and 4) minimization of odors.</p>	<ul style="list-style-type: none"> <li>• Digester Time/Temperature</li> </ul>																						



## Environmental Management System for Biosolids

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**Environmental Management System for Biosolids**

<p>Unsuitables</p>	<p>Disposal in Landfill</p>	<p><u>40 CFR Part 258.28 – Liquid Restrictions:</u> Liquid waste may not be placed in a MSWLF. Liquid waste is any waste material that is determined to contain ‘free liquids’ as defined in the Paint Filter Liquids Test.</p> <p>The biosolids/sludge must not exhibit any of the following characteristics:</p> <p><u>40 CFR Part 261.21 – Characteristic of Ignitability</u> The capability of causing fire through friction, absorption of moisture or spontaneous chemical changes under standard temperature and pressure and, when ignited, burns so vigorously and persistently that it creates a hazard.</p> <p><u>40 CFR Part 261.22 – Characteristic of Corrosivity</u> It is aqueous and has a pH <math>\leq 2</math> or <math>\geq 12.5</math>.</p> <p><u>40 CFR Part 261.23 – Characteristic of Reactivity</u> It is 1) normally unstable and readily undergoes violent change without detonating; 2) reacts violently with water; 3) forms potentially explosive mixtures with water; 4) generates toxic gases when mixed with water; 5) a cyanide or sulfide bearing waste which generates toxic gases when exposed to pH conditions between 2 and 12.5.</p> <p><u>40 CFR Part 261.24 – Toxicity Characteristic</u> Contains any of the contaminants listed in Table 1 in 261.24 at the concentration <math>\geq</math> the respective value given in the table.</p> <p><u>40 CFR Part 761.50(a)(4) – General PCB Disposal Requirements</u></p>	<ul style="list-style-type: none"> <li>• Paint Filter Liquids Test – Method 9095B</li>   <li>• Flash Point Test Method 1020B</li>   <li>• pH Meter</li>   <li>• Method SW-847 Chapter 7/9014 (Reactive Cyanides)</li> <li>• Method SW-847 Chapter 7/9034 (reactive sulfides)</li>   <li>• Toxicity Characteristic Leaching Procedure (TCLP) Test Method 1311</li> <li>• PCBs&lt;50ppm</li> </ul>
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**Revision History**

<b>Version Number</b>	<b>Version Date</b>	<b>Description of Revision</b>
0	11/7/05	Original issue.
1	10/13/11	Edited Footer with Official Document Location