BIOSOLIDS MANAGEMENT PLAN

Prepared for:
Spokane County Division of Utilities
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September 2009
Final

Prepared by:
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HDR Engineering, Inc.
Table of Contents

**Introduction and Background** ................................................................. 1

- Previous Studies .................................................................................. 1
  - Wastewater Facilities Plan ................................................................. 1
  - Wastewater Facilities Plan Amendment .............................................. 2
  - Ecology Approval of Wastewater Facilities Plan .................................. 3
  - Changes after the Wastewater Facilities Plan Amendment ................. 3
  - 2006 Wastewater Facilities Plan Amendment .................................... 4
  - Environmental Analysis ................................................................. 4

- Authorization ....................................................................................... 4
- Purpose .............................................................................................. 4
- Plan Overview ................................................................................... 5

**Spokane County Regional Water Reclamation Facility Overview** ............ 6

- SCRWRF Residuals .............................................................................. 6
- SCRWRF Biosolids Quantities ............................................................. 7

**Regulatory Review** ........................................................................ 8

- Pollutant Criteria ............................................................................... 8
- Pathogen Criteria ............................................................................. 10
  - Class B Biosolids ........................................................................... 10
  - Class A Biosolids ......................................................................... 11
- Vector Attraction Reduction .............................................................. 13
- Biosolids Management Practices ....................................................... 13
  - General .......................................................................................... 13
  - Agronomic Application Rates ......................................................... 13
  - Monitoring ................................................................................... 15

**Trends and Drivers for Biosolids Management Programs** ................. 16

- Regulatory Issues ............................................................................... 17
  - Pathogen Regrowth and Reactivation .............................................. 18
  - Microconstituents of Concern ......................................................... 18
- Public Perception ............................................................................... 18

**Local Biosolids Management Program Profiles** ................................ 19

- City of Spokane Biosolids Management Program .................................. 19
- LOTT Alliance Biosolids Management Program ................................... 20
- City of Richland Biosolids Management Program ............................... 20
- City of Walla Walla Biosolids Management Program ............................ 21
# TABLE of CONTENTS

City of Coeur d’Alene, Idaho Biosolids Management Program ........................................... 22

**Spokane County Biosolids Markets and Management Alternatives... 24**

- Landfill Disposal ........................................................................................................... 24
- Dedicated Surface Disposal (Class B) ........................................................................... 24
- Agricultural Fertilization (Class B) ............................................................................... 25
- Silvicultural Fertilization (Class B) ............................................................................... 26
- Disturbed Land Reclamation/Rehabilitation (Class B) ................................................... 26
- Alternative Intermediate/Final Landfill Cover ............................................................ 27
- Agricultural Fertilization (Class A) ............................................................................... 27
- Public Parks and Recreation Areas (Class A/EQ Compost or Dried Pellets) ............... 27
- Horticulture (Class A/EQ Soil Amendment) ................................................................. 29
- Amendment for Acidic Soils (Class A/EQ Alkaline Soil Amendment) ........................... 29
- Golf Course Fertilizer (Class A/EQ Dried Pellet) ......................................................... 30
- Biofuel Feedstock Fertilization ..................................................................................... 30
- Glass Aggregate Production .......................................................................................... 30
- Solid Fuel (Coal Alternative) Production ....................................................................... 31
- EnerTech .......................................................................................................................... 32
- Cement Kilns .................................................................................................................. 32
- Liquid Fuel/Syn Gas Production ..................................................................................... 32
- Pyrolysis .......................................................................................................................... 33
- Gasification ...................................................................................................................... 33
- Incineration ...................................................................................................................... 33

**Alternatives Screening and Elimination ..................................................................... 34**

- Landfill Disposal .......................................................................................................... 34
- Dedicated Surface Disposal ........................................................................................... 34
- Amendment for Acidic Soils (Alkaline Stabilization) ....................................................... 35
- Vitrification (Glass Aggregate Production) ..................................................................... 35
- Solid Fuel (Coal Alternative) ......................................................................................... 35
- Liquid Fuel/Syn Gas Production ..................................................................................... 35
- Incineration ...................................................................................................................... 35

**Final Alternatives ........................................................................................................ 36**

- Alternative 1: Agricultural Fertilization ....................................................................... 36
  - Alternative 1A: County Management ........................................................................ 37
  - Alternative 1B: Public-Private Partnership ................................................................ 37
  - Alternative 1C: Partnership with the City of Spokane .............................................. 38
- Alternative 2: Alternative Landfill Cover (Class B) ...................................................... 38
  - Alternative 2A: Roosevelt Regional Landfill ............................................................. 38
<table>
<thead>
<tr>
<th>Alternative</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2B</td>
<td>Kootenai County (Idaho) Fighting Creek Landfill</td>
<td>38</td>
</tr>
<tr>
<td>2C</td>
<td>Graham Road Landfill</td>
<td>39</td>
</tr>
<tr>
<td>2D</td>
<td>Ephrata Landfill</td>
<td>39</td>
</tr>
<tr>
<td>3</td>
<td>Reclamation/Restoration (Class B)</td>
<td>39</td>
</tr>
<tr>
<td>3A</td>
<td>Silver Valley mines</td>
<td>39</td>
</tr>
<tr>
<td>3B</td>
<td>Other Future Reclamation</td>
<td>39</td>
</tr>
<tr>
<td>4</td>
<td>Forestry Application</td>
<td>39</td>
</tr>
<tr>
<td>4A</td>
<td>Inland Empire Paper</td>
<td>40</td>
</tr>
<tr>
<td>4B</td>
<td>Stimson Lumber</td>
<td>40</td>
</tr>
<tr>
<td>4C</td>
<td>Forest Capital Partners</td>
<td>40</td>
</tr>
<tr>
<td>5</td>
<td>Composting (Class A/EQ)</td>
<td>40</td>
</tr>
<tr>
<td>5A</td>
<td>County-Operated Composting Facility</td>
<td>40</td>
</tr>
<tr>
<td>5B</td>
<td>Public-Private Partnership</td>
<td>41</td>
</tr>
<tr>
<td>5C</td>
<td>Co-Composting with County Yard Waste</td>
<td>42</td>
</tr>
<tr>
<td>6</td>
<td>Dried Pellet Production (Class A/EQ)</td>
<td>42</td>
</tr>
<tr>
<td>6A</td>
<td>County-Operated Drying Facility</td>
<td>46</td>
</tr>
<tr>
<td>6B</td>
<td>DBO Firm Amendment</td>
<td>46</td>
</tr>
<tr>
<td>6C</td>
<td>Public-Private Partnership</td>
<td>46</td>
</tr>
</tbody>
</table>

**Alternatives Analysis** .............................................................................. 47

- Life-Cycle Cost Evaluation ........................................................................ 47
- Non-Cost Evaluation ................................................................................... 47
- Biosolids Program Diversification ................................................................ 50
- Public Involvement .................................................................................... 52

**Recommended Plan** .................................................................................. 53

**Plan Implementation** .............................................................................. 55

**Glossary** .................................................................................................. 57

**References** ............................................................................................... 59

**Appendix A – Summary of January 2001 Public Meeting** ......................... 61

**Appendix B – Minutes from January 14, 2008 Meetings with Department of Ecology and Lands Council** ................................................................. 63

**Appendix C – SEPA Checklist** .................................................................. 67

**Appendix D – Summary of April 2008 Public Meeting** ............................ 69
List of Tables

Table 1. Projected SCRWRF Biosolids Production ................................................................. 7
Table 2. Pollutant Concentration (PC) Biosolids ................................................................. 9
Table 3. Maximum Allowable Metal Concentrations and Cumulative Loading Rates. .......... 9
Table 4. Site Restrictions for Class B Biosolids Application ............................................. 11
Table 5. Alternatives for Meeting Part 503 Class A Requirements .................................. 12
Table 6. Phosphorus Index for Washington and Oregon, Transport and Source Factors .......... 14
Table 7. Frequency of Monitoring Required by Part 503 Regulations ............................ 15
Table 8. City of Spokane Biosolids Management Program Costs .................................. 19
Table 9. LOTT Alliance Annual Biosolids Management Costs (2006) ......................... 20
Table 10. City of Richland Annual Biosolids Management Costs (2007) ..................... 21
Table 13. Summary of Local Biosolids Programs and Costs ............................................ 23
Table 14. Potential Markets for Spokane County Biosolids ........................................... 28
Table 15. Biosolids Management Alternatives for Spokane County ............................... 36
Table 16. Spokane County Agricultural Data for Calendar Year 2006 (USDA) ............ 36
Table 17. Spokane Area Golf Course Fertilization and Market Analysis .......................... 43
Table 18. Potential Biosolids Demand at Public Parks in Spokane County .................... 43
Table 19. Summary of Dried Pellet Market Analysis for Spokane County Area ................ 45
Table 20. Estimate of Probable Life Cycle Costs for Final Biosolids Management Alternatives ................................................................. 48
Table 21. Non-Cost Evaluation of Biosolids Management Alternatives .......................... 49
Table 22. Diversification Options for Spokane County Biosolids Management Program ................................................................. 51

List of Figures

Figure 1. Future Site of the Spokane County Regional Water Reclamation Facility. 6
Figure 2. Alternative 1, Regime D: solids concentration less than seven percent, at least 30 minutes contact time, (from 40 CFR Part 503). ............................................. 12
Figure 3. Estimate of Biosolids Use/Disposal in the United States in 2004, (NEBRA, 2007) ....................................................................................................................... 16
Figure 4. Estimate of Biosolids Use/Disposal in Washington State in 2004, (NEBRA, 2007) ....................................................................................................................... 16
Figure 5. Photo of Coeur d’Alene, Idaho Aerated Static Pile Composting Facility. 22
Figure 6. Types of Dedicated Surface Disposal, (Source: EPA, 1999; Figure 3-1). 25
Figure 7. Photo of Biosolids Application onto Dryland Grain, (courtesy of King County, Washington) ....................................................................................................................... 25
<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>Photo of biosolids application onto forests, (courtesy of King County, Washington)</td>
<td>26</td>
</tr>
<tr>
<td>9</td>
<td>Before (l) and after (r) photos showing revegetation after biosolids application, (courtesy of Northwest Biosolids Management Association)</td>
<td>26</td>
</tr>
<tr>
<td>10</td>
<td>Photo of Use of Biosolids for Alternative Cover Amendment, (courtesy of Greater Vancouver Regional District)</td>
<td>27</td>
</tr>
<tr>
<td>11</td>
<td>Minergy® GlassPack® Facility Schematic (l) and Photo of Zion, Illinois Facility (r) (Courtesy of Minergy®)</td>
<td>31</td>
</tr>
<tr>
<td>12</td>
<td>Schematic of EnerTech SlurryCarb™ Process (Courtesy of EnerTech)</td>
<td>32</td>
</tr>
</tbody>
</table>
**Introduction and Background**

The Spokane County Utilities Division provides wastewater management for residential, commercial and industrial customers in the Spokane Valley and North Spokane service areas through an interlocal agreement with the City of Spokane. Currently, wastewater generated in the County is sent via a sewer network to the Riverside Park Water Reclamation Facility (RPWRF), which is operated by the City of Spokane. A 1980 interlocal agreement established the basis for the City to treat up to 10 million gallons per day of County-generated wastewater. The County expects to exceed that capacity by the end of 2013. Due to physical, environmental and implementation constraints, additional capacity at the RPWRF may not be available for use by the County, or may be insufficient for the County’s long-term needs.

The County began a program in 1980 to eliminate septic tanks and connect customers to the County’s sewer system to protect the Spokane Aquifer. Since the Septic Tank Elimination Program (STEP) began, over 20,000 customers have connected. This sewer expansion program is projected to continue through the year 2015 to provide wastewater service to all existing development within the County’s sewer service area. By 2015, it is expected that approximately 11,700 additional existing septic tank customers will connect to the sewer system.

Along with the sewer system extensions, the County’s sewer service area is projected to experience significant growth over the next twenty years to meet growth management requirements. As a result of STEP and the projected population increase, the population served by the County sewer system may double by 2030 from 80,000 to over 167,000 people. Both factors will sharply increase the quantity of wastewater that must be responsibly managed.

Given this, the County has conducted a wastewater facilities planning process to develop long-term wastewater management strategies that will provide reliable service, protect the environment, and be economical to local ratepayers.

**Previous Studies**

The following sections describe and discuss the planning work related to management of Spokane County’s wastewater. The following sections are in chronological order, starting with the most recent work.

**Wastewater Facilities Plan**

On February 19, 2002, the Spokane County Board of Commissioners adopted a Draft *Wastewater Facilities Plan* that established a flexible, long-term management strategy, through a phased implementation program to meet capacity and treatment requirements over the next 25 years. The plan encompassed the following components:

- Controlling wastewater generation through use of programs that are enforceable, technically workable and fair.
- Maximizing use of the County’s prior investment in the City of Spokane’s Riverside Park Water Reclamation Facility (RPWRF).
• Building a new treatment plant to serve growth and continued implementation of the septic tank abatement program.

• Producing highly treated effluent for discharge to the Spokane River that meets all water quality and regulatory requirements.

• Actively pursuing reclaimed water beneficial use measures that are affordable and which will augment the region’s water resources.

• Beneficially reusing all biosolids produced at the treatment facilities.

The Final Wastewater Facilities Plan was issued in December 2002.

Wastewater Facilities Plan Amendment

In February 2003, a Final Wastewater Facilities Plan Amendment¹ (2003 FPA) was issued. The 2003 FPA was prepared for three primary reasons:

• To provide additional water quality analyses to demonstrate that Spokane County’s wastewater management plan will be protective of aquatic and public health

• To provide additional site-specific detail needed to fulfill the Washington State Department of Ecology’s (Ecology’s) requirements for a Facilities Plan/Engineering Report

• To describe progress on other key implementation activities identified in the Wastewater Facilities Plan.

The major work elements associated with the 2003 FPA were as follows:

• Refine appropriate effluent quality requirements for discharge to the Spokane River through additional near-field dissolved oxygen analyses, participate in Ecology’s dissolved oxygen total maximum daily load (TMDL) process, and perform mixing zone analyses for temperature and toxic constituents.

• Conduct a siting study to identify a suitable site for the new Spokane County Regional Water Reclamation Facility (SCRWRF).

• Evaluate alternative treatment technologies and select a treatment concept that will effectively meet anticipated near-term and long-term effluent quality requirements associated with the beneficial reuse practices planned by the County.

• Develop a site-specific, conceptual design of the proposed SCRWRF that meets Ecology’s requirements for a Facilities Plan/Engineering Report, and establishes the level of aesthetic mitigation anticipated for the project.

• Further define pumping stations and pipelines needed to convey wastewater to the SCRWRF.

• Further define pipeline and diffuser requirements needed to convey and discharge treated effluent to the Spokane River.

¹ HDR Engineering, Inc., Spokane County Wastewater Facilities Plan Amendment (Final), February 2003.
• Conduct an effective public involvement process to guide the siting study and the definition of appropriate aesthetic mitigation measures for the SCRWRF.

• Prepare a cost-effectiveness analysis to meet the requirements of the State environmental review process (Chapter 173-98-100).

• Update cost estimates and implementation schedules, and document progress on key implementation activities.

The 2003 FPA recommended construction of a membrane bioreactor (MBR) process that incorporates nitrification/denitrification, chemically-assisted phosphorus removal and ultraviolet light (UV) disinfection. Two finalist sites were identified and evaluated in detail: the former Stockyards site and the Alki-Fancher site. The Stockyards site was the preferred location for the new regional plant and the property has since been purchased by Spokane County.

Ecology Approval of Wastewater Facilities Plan


Changes after the Wastewater Facilities Plan Amendment

After the completion of the 2003 FPA, a number of changes occurred that affect the timing and treatment performance objectives for the new regional plant. These changes are listed below:

• City of Spokane Valley Incorporation. Following the incorporation of the City of Spokane Valley, project implementation was delayed for nine to twelve months as the new city reviewed its governance options for wastewater management. The City indicated a preference to have Spokane County provide wastewater management for the sewer service area within the City limits.

• Stockyards Site Purchased. Spokane County selected the Stockyards site as the preferred location for the Spokane County Regional Water Reclamation Facility and purchased the site in June 2004.

• Dissolved Oxygen TMDL. The Washington Department of Ecology published a draft Dissolved Oxygen TMDL in October 2004 and a lengthy collaboration process culminated in the publication of the Foundational Concepts for the Spokane River TMDL Managed Implementation Plan (Foundational Concepts document) on June 30, 2006. This document identifies the effluent phosphorus requirements for a Spokane County discharge to the Spokane River with a combination of treatment technology and other offset actions to achieve compliance with a seasonal average 10 ug/l phosphorus target, which is more stringent than provided for in the analysis conducted for the Wastewater Facilities Plan and the 2003 FPA.
2006 Wastewater Facilities Plan Amendment

The 2006 Wastewater Facilities Plan Amendment (2006 FPA) is an update to the previously published and approved Wastewater Facilities Plan and the 2003 FPA. The 2006 FPA updates the recommendations of the original Wastewater Facilities Plan and the 2003 FPA to meet the expected requirements of the Washington Department of Ecology’s Dissolved Oxygen TMDL, which is expected to be finalized in 2008. The Foundational Concepts document provides Spokane County a wasteload allocation and identifies the effluent phosphorus requirements for a Spokane County discharge to the Spokane River through a combination of treatment technology and other offset actions to achieve compliance with the seasonal average 10 µg/l phosphorus target.

Environmental Analysis

To address environmental and community issues, a programmatic Environmental Impact Statement (EIS) was prepared to address the wastewater management concept identified in the Wastewater Facilities Plan. This EIS became final in February 2002. In addition, a Supplemental EIS (SEIS) was prepared to address project specifics and the site selection process for the SCRWRF and conveyance facilities. The SEIS became final December 13, 2002. An EIS Addendum was published in December 2006 in conjunction with the Draft 2006 FPA to update the environmental analysis in response to the Foundational Concepts document. It contains a waste load allocation for Spokane County and target pursuit actions associated with the County’s proposed discharge to the Spokane River.

Authorization

On February 4, 2000, the Spokane County Board of Commissioners authorized HDR Engineering, Inc. to proceed with preparation of the Wastewater Facilities Plan (Contract 99-214). In February 2002, the Spokane County Board of Commissioners approved Amendment No. 2 to prepare the Wastewater Facilities Plan Amendment. In May 2006, the Spokane County Board of Commissioners approved Amendment No. 8 to prepare the 2006 Wastewater Facilities Plan Amendment. In July 2007, the Spokane County Board of County Commissioners approved Amendment No. 9 to prepare the Reclaimed Water Use Study and this Biosolids Management Plan in conjunction with other assignments related to the contractor procurement for the Design-Build-Operate of the Spokane County Regional Water Reclamation Facility.

Purpose

The proposed SCRWRF will produce highly treated water as well as several solids products including biosolids. The purpose of this Biosolids Management Plan is to identify the potential alternatives, the demand for biosolids, customers and their needs, potential program impediments, costs, and transportation options. The approach of this study is to review the pertinent regulations on management of the County’s biosolids, present alternatives for biosolids management, and recommend a management approach that will be implemented when the SCRWRF begins biosolids production.

The scope of work for this Biosolids Management Plan is based on the assumption that the County’s 2006 FPA is approved by the Washington Department of Ecology. Washington State supports the implementation of a biosolids beneficial reuse program.
by Spokane County as stated in Section 173-308 of the Washington Administrative Code (WAC).

One of the goals of the 2006 FPA’s recommended plan is beneficial reuse of all biosolids produced at the SCRWRF. A wide range of biosolids management alternatives was identified in the Wastewater Facilities Plan. The 2006 FPA reviews and summarizes the biosolids management concepts considered in the original facilities planning efforts. The recommended biosolids management program from the 2006 FPA is that all biosolids produced at the SCRWRF be stabilized through anaerobic digestion and dewatered to produce Class B biosolids. The 2006 FPA recommends that the material be applied to agricultural land or to reclaimed mining sites. However, this Biosolids Management Plan re-examines a broader group of biosolids management alternatives including those recommended previously.

**Plan Overview**

This technical report has been organized into the following sections:

- SCRWRF Overview
- Regulatory Review
- Trends and Drivers for Biosolids Management Programs
- Local Biosolids Management Program Profiles
- Spokane County Biosolids Markets and Management Alternatives
- Alternatives Screening
- Final Alternatives Analysis
- Recommended Approach
- Plan Implementation
Spokane County Regional Water Reclamation Facility Overview

The Spokane County Regional Water Reclamation Facility (SCRWRF) was recommended in the 2006 FPA and previous planning efforts to treat the County’s wastewater. The SCRWRF is expected to be operational by mid-2012, and will be located within the City of Spokane at the location of the old Stockyards site southeast of Spokane Community College (see Figure 1). The County has elected to implement the Spokane SCRWRF as a design-build-operate (DBO) contract.

Figure 1. Future Site of the Spokane County Regional Water Reclamation Facility.

SCRWRF Residuals

During the water reclamation process, residuals are removed from raw wastewater. Plastics, sand, rocks, and other debris will be removed in the first stages of treatment and these residuals will be disposed of at a landfill. Sludge is the mostly organic residual that is removed during the gravity settling and biological treatment processes. When removed from wastewater, sludge is mostly water, varying from 0.5 to 4 percent solids (96 to 99.5 percent water). It must be thickened and treated before being beneficially reused or recycled.

Biosolids are treated (digested) sludges capable of being beneficially recycled, and must meet state and federal treatment standards (described below). Biosolids typically have a slight earthy, humus-like smell. Excess water is typically removed prior to and after treatment (digestion) to reduce handling, processing, and transportation costs. The
excess water is recycled to the beginning of the water reclamation process for treatment.

The Primary Design Document (Engineering Report) provides an evaluation of the technology that would be implemented at the SCRWF. Recommended solids processing technology and processes included solids thickening, conventional mesophilic anaerobic digestion, and mechanical dewatering. This recommended solids process train would produce Class B dewatered cake biosolids at the SCRWF. The ability to operate at thermophilic temperatures (approximately 131°F) for Class A biosolids production was recommended including providing insulation and blind flange connections where future equipment will be added. Allowance for additional piping to operate the digesters in the Columbus Biosolids Flow-Through Thermophilic Treatment (CBFT3) process in order to meet Class A requirements was recommended. The CBFT3 process would also require construction of three holding tanks to meet Class A biosolids criteria.

Since the project will be delivered using a design-build-operate firm, the processing and biosolids quantities and qualities of the biosolids that will be produced at the SCRWF are not completely known. The minimum requirements specified in the DBO request for proposals (RFP), issued October 15, 2007, are that all of the solids be anaerobically digested and dewatered to a minimum solids concentration of 20 percent. SCRWF biosolids must meet Class B and vector attraction reduction criteria.

**SCRWF Biosolids Quantities**

Table 1 presents the estimated biosolids production at the SCRWF at 8 and 12 million gallons per day (mgd) average annual flows. Truck load estimates assume a 30 cubic yard capacity truck, which is equivalent to three standard dump trucks. The projections assume that biosolids have a solids concentration of 20 percent, which is the minimum solids concentration specified in the DBO procurement documents.

Table 1. Projected SCRWF Biosolids Production.

<table>
<thead>
<tr>
<th>Year</th>
<th>Plant Flow (mgd)</th>
<th>Biosolids (Wet tons per day)</th>
<th>Truck loads (30 cubic yard)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>8</td>
<td>25.8</td>
<td>7 per week</td>
</tr>
<tr>
<td>~2030</td>
<td>12</td>
<td>38.6</td>
<td>10.4 per week</td>
</tr>
</tbody>
</table>

mgd = million gallons per day
Regulatory Review

The policy of the US Environmental Protection Agency (EPA) is to promote the beneficial use of biosolids while maintaining environmental quality and protecting public health (EPA, 2003). The Clean Water Act Amendments of 1987 required the EPA to develop new regulations pertaining to sewage sludge/biosolids. In February, 1993, EPA published 40 CFR Part 503 (i.e., Part 503). The Part 503 Rule is a complex, risk-based assessment of potential environmental effects of pollutants that may be present in biosolids (USEPA, 1995). These guidelines regulate pollutant and pathogen concentrations as well as vector attraction reduction (VAR). The guideline defines biosolids as Class A or Class B, depending on the potential level of pathogens. Class A biosolids must meet strict pathogen standards and can be used with no restrictions, while Class B biosolids can meet less stringent pathogen requirements, with application restricted to crops with limited human and animal exposure. Biosolids in both classes must meet VAR requirements.

The Part 503 Rule applies to biosolids applied to agricultural and non-agricultural land, biosolids placed in or on surface disposal sites, and biosolids that are incinerated. Biosolids that are land filled or used as a cover material at a landfill are subject to federal requirements in 40 CFR Part 258. The general provisions of the Part 503 Rule provide basic requirements for biosolids applied to land including pollutant limits, management practices, operational standards, and monitoring, record keeping and reporting. This report will not discuss requirements for incineration since this is not considered a viable biosolids management option for the County.

Pollutant Criteria

Two approaches to meeting the Part 503 metals limits are allowed:

- A maximum concentration in the biosolids must be met, or
- A maximum cumulative amount of metals added to the soil from biosolids application must be met.

Biosolids meeting the Part 503 requirements by the first method are called pollutant concentration (PC) biosolids, and limits are shown in Table 2. If biosolids metals meet these concentrations, no record keeping of cumulative loading to soils is required for land application. If PC biosolids also meet Class A pathogen reduction standards, they are considered exceptional quality (EQ), and may be distributed to the general public.

Biosolids meeting the metals limits of the Part 503 regulations by the second method are called cumulative pollutant loading rate (CPLR) biosolids. Column two of Table 3 shows the maximum allowable metals concentrations in any biosolids applied to land. Columns three and four of Table 3 show the maximum allowable cumulative loading rates of metals applied to land.
Table 2. Pollutant Concentration (PC) Biosolids.

<table>
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<tr>
<th>Pollutant</th>
<th>Allowable Concentration (mg/kg monthly average)</th>
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<tbody>
<tr>
<td>Arsenic (As)</td>
<td>41</td>
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<tr>
<td>Cadmium (Cd)</td>
<td>39</td>
</tr>
<tr>
<td>Copper (Cu)</td>
<td>1,500</td>
</tr>
<tr>
<td>Lead (Pb)</td>
<td>300</td>
</tr>
<tr>
<td>Mercury (Hg)</td>
<td>17</td>
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<tr>
<td>Nickel (Ni)</td>
<td>420</td>
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<tr>
<td>Selenium (Se)</td>
<td>100</td>
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<tr>
<td>Zinc (Zn)</td>
<td>2,800</td>
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Source: Table 3 of 40 CFR 503.13

Table 3. Maximum Allowable Metal Concentrations and Cumulative Loading Rates.

<table>
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<th>Pollutant</th>
<th>Allowable Concentration (mg/kg dry wt.)</th>
<th>CPLR Loading</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Kg/ha</td>
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<tr>
<td>Arsenic (As)</td>
<td>75</td>
<td>41</td>
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<tr>
<td>Cadmium (Cd)</td>
<td>85</td>
<td>39</td>
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<tr>
<td>Copper (Cu)</td>
<td>4,300</td>
<td>1,500</td>
</tr>
<tr>
<td>Lead (Pb)</td>
<td>840</td>
<td>300</td>
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<tr>
<td>Mercury (Hg)</td>
<td>57</td>
<td>17</td>
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<td>Molybdenum (Mo)(^1)</td>
<td>75</td>
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<td>Nickel (Ni)</td>
<td>420</td>
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<tr>
<td>Selenium (Se)</td>
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<td>100</td>
</tr>
<tr>
<td>Zinc (Zn)</td>
<td>7,500</td>
<td>2,800</td>
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</tbody>
</table>

Source: Tables 1 and 2 of 40 CFR 503.13

Notes:
1. *No cumulative limit for molybdenum.*
2. *CPLR = Cumulative Pollutant Loading Rate.*

Technologies to produce Class A and Class B biosolids generally do not decrease concentrations of metals in biosolids, unless other material is mixed with biosolids such as amendment material for composting.

An effective industrial pretreatment program is the key to complying with Part 503 metals limits, as industrial inputs into the collection system are the primary source of metals. EPA is currently considering whether other compounds should be regulated in biosolids.
Pathogen Criteria

Two classes of biosolids are defined by EPA that can be land applied, Class A and Class B. Class A biosolids are pathogen-free and can be used without any additional public contact restrictions. Class B biosolids may have low levels of pathogens, and restrictions are imposed on public access and crop harvesting after land application, which are described in the following sections.

Class B Biosolids

Class B biosolids are the predominant class of biosolids produced in the US (USEPA, 1999; NEBRA, 2007). Common treatment technologies, such as aerobic and anaerobic digestion, are used at many municipal wastewater treatment plants to inactivate the vast majority of potential pathogens in biosolids. However, the biosolids are not considered “pathogen-free,” and EPA requires that specific management practices be employed to protect the public. Class B biosolids must also meet the same vector attraction reduction requirements as Class A biosolids.

Class B biosolids must meet one of several pathogen destruction alternatives including the following:

Alternative 1: Meet monitoring requirements for fecal coliform (geometric mean fecal coliform density must be less than 2 million CFU or MPN per gram of biosolids).

Alternative 2: Employ a Process to Significantly Reduce Pathogens (PSRP), or

Alternative 3: Employ a process equivalent to a PSRP.

PSRPs include the following:

- Anaerobic digestion between 15 days at 35°C (95°F) to 60 days at 20°C (68°F).
- Aerobic digestion between 40 days at 20°C (68°F) to 60 days at 15°C (59°F).
- Air drying for at least 3 months.
- Composting: temperature of the sludge must be 40°C (104°F) or higher for at least five days. For four hours of that period, the temperature must be 55°C (131°F) or higher.
- Lime stabilization: the pH of the sludge must be raised to 12 for at least two hours, and must remain above 11.5 for 24 hours.

Alternative 3 for Class B biosolids requires approval of the USEPA or state regulatory agency. The regulating authority makes the decision on whether or not a process should be considered as equivalent to a PSRP. Both equivalent processes and PSRPs must meet specified pathogen requirements as well.

Biosolids treatment must include a method for reducing the attraction of vectors. Alternatives depend on the method of treatment and include 38 percent volatile solids (VS) destruction, and a specific oxygen uptake rate of less than 1.5 mg oxygen per hour per gram total solids. Meeting the 38 percent VS destruction criteria for VAR is usually easily achieved during anaerobic digestion due to the high efficiency of the process.
Management practices are required to limit public and animal contact after Class B biosolids are applied and to allow natural processes to further inactivate potential pathogens. The management practices for Class B biosolids are in addition to the general management requirements specified in Subpart A of the Part 503 regulations, and are summarized in Table 4.

Table 4. Site Restrictions for Class B Biosolids Application.

<table>
<thead>
<tr>
<th>Land/Crop Characteristic</th>
<th>Regulatory Criteria (State and Federal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land with a high potential for public exposure</td>
<td>Public access restricted for 1 year after biosolids application</td>
</tr>
<tr>
<td>Land with a low potential for public exposure</td>
<td>Public access restricted for 30 days after biosolids application</td>
</tr>
<tr>
<td>Food crops, feed crops or fiber crops</td>
<td>Not harvested for 30 days after biosolids application</td>
</tr>
<tr>
<td>Food crops with harvested parts that touch the biosolids/soil mixture and are totally above the land surface (e.g., melons, cucumbers)</td>
<td>Not harvested for 14 months after biosolids application</td>
</tr>
<tr>
<td>Food crops with harvested parts below the land surface (e.g., root crops such as potatoes, carrots, radishes)</td>
<td>Not harvested for 20 months after biosolids application</td>
</tr>
<tr>
<td>Animal grazing on a site</td>
<td>Restricted for 30 days after biosolids application</td>
</tr>
<tr>
<td>Turf placed on land with high potential for public exposure or a lawn unless otherwise specified by the permitting authority</td>
<td>Restricted for 1 year after biosolids application</td>
</tr>
</tbody>
</table>

Class A Biosolids

Producing Class A biosolids may provide cost savings and flexibility for biosolids management depending on the treatment process and the quality of the final product, and can generate revenue in some cases. However, Class A solids treatment technologies generally require increased capital and operations and maintenance (O&M) costs for processing. Producing Class A biosolids can reduce costs associated with acquiring new land application sites compared to the land application of Class B biosolids.

Class A pathogen reduction requirements include fecal coliforms of less than 1,000 Most Probable Number (MPN) per gram Total Solids (TS) or Salmonella of less than 3 MPN per 4 grams TS. Alternatives for meeting Class A pathogen requirements are shown in Table 5.

Thermal treatment means that specific time-temperature requirements must be met as specified by the 503 regulations. Figure 2 shows the time-temperature curve for sludge with a solids concentration less than seven percent and a contact time of at least 30 minutes. Other time-temperature curves apply at different solids concentrations and contact times. All biosolids particles processed using this alternative must be subjected to the EPA specified time-temperature regime, which means that batch or plug-flow processing must be employed: continuous flow processes with a detention time on, or above, the time-temperature curve are not acceptable.
Table 5. Alternatives for Meeting Part 503 Class A Requirements.

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alternative 1</td>
<td>Thermally treated (must meet specific time-temperature requirements depending on solids concentration)</td>
</tr>
<tr>
<td>Alternative 2</td>
<td>High pH-high temperature (lime stabilization followed by air drying)</td>
</tr>
<tr>
<td>Alternative 3a</td>
<td>“Other Processes”: sampling required</td>
</tr>
<tr>
<td>Alternative 4a</td>
<td>“Unknown Processes”: sampling required</td>
</tr>
<tr>
<td>Alternative 5</td>
<td>Use of a Process to Further Reduce Pathogens (PFRP)</td>
</tr>
<tr>
<td>Alternative 6</td>
<td>Process equivalent to PFRP (requires approval of EPA’s Pathogen Equivalency Committee)</td>
</tr>
</tbody>
</table>

a. As mentioned, these alternatives are not allowed under Washington state regulations.

A high pH-high temperature process is defined as the three following conditions:

- A pH of greater than 12 for at least 72 hours,
- Maintaining the temperature of the sludge above 52°C for at least 12 hours while the pH is above 12,
- Air drying to over 50 percent solids after the 72-hour period of elevated pH.

Figure 2. Alternative 1, Regime D: solids concentration less than seven percent, at least 30 minutes contact time, (from 40 CFR Part 503).
Class A biosolids alternatives 3 and 4 (see Table 5) rely on enteric virus and helminth ova testing, which can be expensive and time-consuming (4 weeks for helminth ova, and 2 weeks or longer for enteric viruses). There are also a limited number of accredited laboratories capable of performing these analyses. Washington State eliminated the availability of alternatives 3 and 4 in the 2007 update to the state biosolids rule.

Processes to Further Reduce Pathogens (PFRPs) produce Class A biosolids and include composting, heat drying, heat treatment, thermophilic aerobic digestion (also known as autothermal thermophilic aerobic digestion or ATAD), beta ray irradiation, gamma ray irradiation, and pasteurization.

New processes not specified by the EPA can be considered equivalent to a PFRP. The permitting authority is responsible for determining if a process is equivalent, and this is generally the Pathogen Equivalency Committee (PEC) of the USEPA.

**Vector Attraction Reduction**

Vectors such as flies are attracted to putresible organic matter and can facilitate disease transmission. Federal and state biosolids regulations require that certain standards be met to reduce the attractiveness of biosolids to vectors. Vector attraction reduction (VAR) requirements for Class A biosolids are the same as for Class B requirements. Alternatives depend on the method of treatment and include 38 percent volatile solids (VS) destruction, a specific oxygen uptake rate of less than 1.5 mg oxygen per hour per gram total solids, and others. In general, pathogen reduction must be achieved prior to or at the same time as vector attraction reduction for biosolids to be considered Class A. Problems with pathogen re-growth led EPA to include this provision.

**Biosolids Management Practices**

A number of management practices are required by the Part 503 regulations and apply to bulk (large quantities) land application of both Class A and Class B biosolids.

**General**

General management practices required for land application include providing buffer zones around wells, surface water, and property boundaries; not causing any adverse impact to threatened or endangered species; and not applying biosolids to flooded, frozen, or snow-covered land.

**Agronomic Application Rates**

Another key general management requirement is that biosolids be applied at an agronomic rate. Nitrogen application (dry weight basis) must not exceed that needed by a crop or vegetation. As defined in 40 CFR 503:

“Agronomic rate is the whole sludge application rate (dry weight basis) designed:

- To provide the amount of nitrogen needed by the food crop, feed crop, fiber crop, cover crop, or vegetation grown on land; and
- To minimize the amount of nitrogen in the sewage sludge that passes between the root zone of the crop or vegetation grown on the land to the groundwater.”
Excess nitrogen applied to land could result in nitrate contamination of groundwater. The agronomic rate must be determined by considering total and available nitrogen in the biosolids and the expected yield of the crop or vegetation.

Chapter 173-308 of the Washington Administrative Code (WAC) states that the application rate “shall not exceed the agronomic rate for the particular cultivar grown,” with agronomic rate defined as “a rate of biosolids or domestic septage which matches nutrient requirements for a specific crop on an annual basis.” Rates also must be applied so that runoff, erosion, leaching, nuisance conditions, or groundwater contamination are prevented.

Changing policy in the preparation of NPDES permits by regulators has in some cases resulted in inclusion of conditions that specify that agronomic rates of phosphorus must not be exceeded. However, nitrogen is most commonly used to determine the agronomic rate for biosolids application in most programs. Many states, including Washington, have adopted, or are considering using, a Phosphorus Index to manage phosphorus loading on land application sites. The Phosphorus Index is a risk management-based approach that takes into account transport and source factors to estimate the potential for off-site movement of phosphorus from a given land application site. The Natural Resources Conservation Service developed a Phosphorus Index for Washington (NRCS Water Quality Technical Note No. 2: Revised, October 2001). This guidance document was developed as an assessment tool to help land managers assess the risk of offsite phosphorus migration for an individual site, but was not designed to determine compliance with water quality regulations. The Phosphorus Index for Washington includes separate worksheets for Western and Eastern Washington land application sites. The worksheets generate a site rating based on transport and source factors, and use the site rating to assign a vulnerability class (low, medium, high, very high) indicating the potential for offsite transport. This process uses the transport and source factors shown in Table 6.

Table 6. Phosphorus Index for Washington and Oregon, Transport and Source Factors.

<table>
<thead>
<tr>
<th>Transport Factors</th>
<th>Source Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subsurface drainage</td>
<td>Soil test P concentration</td>
</tr>
<tr>
<td>Soil erosion (sheet and rill, wind)</td>
<td>Commercial P fertilizer application method</td>
</tr>
<tr>
<td>Runoff class</td>
<td>Commercial P fertilizer application rate</td>
</tr>
<tr>
<td>Irrigation-induced erosion</td>
<td>Organic P source application rate</td>
</tr>
<tr>
<td>Flooding frequency</td>
<td>Organic P source application method</td>
</tr>
<tr>
<td>Distance to surface waters/buffer width</td>
<td></td>
</tr>
</tbody>
</table>

Additional research is being conducted at Oregon State University regarding the use of phosphorus indices. Agronomic phosphorus loading limitations have the potential to increase land requirements two to three times beyond that required based on agronomic nitrogen loadings. In general, the agronomic phosphorus loading rates would place more severe restrictions on wastewater facilities that employ phosphorus removal (since significant amounts of phosphorus leave the plant site as stored phosphorus in biosolids) or plants that lands apply biosolids in phosphorus-limited watersheds. This
could be an issue for the County since phosphorus discharges are important in the Spokane River watershed.

**Table 7. Frequency of Monitoring Required by Part 503 Regulations.**

<table>
<thead>
<tr>
<th>Amount of Biosolids per 365-day Period</th>
<th>Minimum Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dry Metric Tons</strong></td>
<td><strong>Dry English Tons</strong></td>
</tr>
<tr>
<td>0-290</td>
<td>0-320</td>
</tr>
<tr>
<td>290-1,500</td>
<td>320-1,654</td>
</tr>
<tr>
<td>1,500-15,000</td>
<td>1,654-16,540</td>
</tr>
<tr>
<td>15,000 or greater</td>
<td>16,540 or greater</td>
</tr>
</tbody>
</table>

Reprint of Table 3-4 from USEPA, 2003
1 metric ton = 1.1 English tons

**Monitoring**

Microbiological monitoring for either fecal coliforms or Salmonella is required for all biosolids. For Class A biosolids, each sample analyzed must meet the requirements, not just the average of several samples. Requirements must be met at the time of use or disposal, at the time the biosolids are prepared for sale or give away in a bag or other container for land application, or at the time the biosolids or material derived from the biosolids (e.g. compost) is prepared to meet the requirements in Part 503.

Monitoring requirements vary by the size of the wastewater utility and the method of sludge processing. Table 7 summarizes the required frequency of monitoring for all biosolids under Part 503, which depends on the quantity produced by a utility in a given year.
Trends and Drivers for Biosolids Management Programs

Figure 3 shows the breakdown of biosolids use/disposal in the United States in 2004 as reported by the EPA. Land application, storage for application, and advanced treatment (Class A or similar processing) represent over half of the biosolids use in the United States.

Figure 3. Estimate of Biosolids Use/Disposal in the United States in 2004, (NEBRA, 2007).

Figure 4 shows the breakdown of biosolids use/disposal in Washington State in 2004. Agricultural land application is the most common biosolids use in the state, followed by landfiling (including use as a daily cover) and incineration. Exceptional Quality (EQ) biosolids distribution represents more than ten percent of the state’s biosolids use. The largest such program in the state is in the City of Tacoma. The majority of Tacoma’s biosolids are used to produce a variety of soil amendments.
Figure 4. Estimate of Biosolids Use/Disposal in Washington State in 2004, (NEBRA, 2007).

Regulatory Issues

In spite of the nearly unblemished experience with biosolids land application programs, nationally and internationally there continues to be pressures to question the long-term safety of this practice, both to the environment and to human health. It is known that biosolids can contain numerous substances with the potential to be harmful, and there is ongoing debate on the relative risks.

The National Academies of Science (NAS) completed an assessment of the science that supports the Part 503 Rule in 2002, and concluded that there is no evidence that current biosolids management practices under existing regulations are not safe, but that more research is required to update the science behind the regulations (NRC, 2002). NAS concerns included the synergistic effects of chemical pollutants and pathogens, and other pathogens and chemical pollutants not considered in the risk assessment of the Part 503 Rule.

EPA is currently reviewing the Part 503 regulations and is expected to issue an updated version in the near future. EPA is performing a sewage sludge survey to assess a
variety of compounds that are not currently regulated under the Part 503 rule. It is possible that additional compounds may be regulated under the new biosolids rule.

Pathogen Regrowth and Reactivation
Recent research by the Water Environment Research Foundation (WERF) has shown that fecal coliform; the indicator organism commonly used for pathogens, sometimes reactivates and/or regrows after mechanical dewatering of solids. This has occurred with a variety of anaerobic digestion processes, both Class B and Class A. Research is ongoing to further understand the mechanisms and causes of this phenomenon. Research to date has shown that high solids centrifuges have the greatest potential to reactivate/regrow fecal coliform. This research could ultimately lead to changes in the regulatory requirements.

Microconstituents of Concern
Microconstituents of concern (MoCs) are pharmaceuticals, personal care products, their intermediates, and other compounds that have been found at low levels in the environment and in biosolids. WERF is currently developing a technical practice update to address the status of the science, risks, and public perception surrounding the issue. To date, no increased risk from current biosolids management practices has been demonstrated, but research is ongoing for this complex issue.

Public Perception
Political divisions and conflicts have emerged over the management of biosolids around the US, particularly in California, Virginia, and Pennsylvania. Local ordinances have been passed banning either Class B or all biosolids land application. More organized opposition to current biosolids management practices is compelling utilities to apply biosolids in more remote areas or process solids more extensively in order to manage biosolids in alternative ways.

Agricultural land application programs have a long and successful history in Washington, as evidenced by the data presented in the previous section. Ecology actively promotes beneficial reuse through land application, and has a de facto ban on landfilling of sludge except under extraordinary conditions or on an emergency basis.

Looking into the future, trends in Europe sometimes portend the future direction of domestic programs. In Europe, public perception related to risks of biosolids land application has resulted in greater focus on energy recovery/combustion technologies such as incineration, cement kilns, and gasification.
Local Biosolids Management Program Profiles

This section describes five biosolids management programs located nearby in Washington and Idaho and presents their estimated program costs. These programs vary in size, type of biosolids produced, management approach, and costs. The purpose of this section is to benchmark costs and present a variety of approaches to managing biosolids by agencies similar to Spokane County. Public acceptance and operations and maintenance issues are also discussed.

City of Spokane Biosolids Management Program

Solids at the City of Spokane’s Riverside Park Water Reclamation Facility (RPWRF) are stabilized through anaerobic digestion and dewatered with centrifuges to generate a Class B biosolids cake. In 2005, the RPWRF produced 7,556 tons of biosolids. The biosolids are currently applied to approximately 2,000 to 3,000 acres of agricultural land per year. The land is owned by about eight farmers who work directly with the City. The 2005 and 2007 biosolids production from RPWRF and associated biosolids management costs are shown in Table 8.

The agricultural application sites are situated within a 25-mile haul (one-way) from RPWRF. Most sites are located in one of the following three areas:

- In the Deep Creek area west of Spokane surrounding the end of the Fairchild Air Force Base landing strip.
- About one mile west of Reardon, Washington. The farmers cultivate dry land grains, specifically spring and winter wheat.

The biosolids management program has had good public acceptance to date.

Table 8. City of Spokane Biosolids Management Program Costs.

<table>
<thead>
<tr>
<th></th>
<th>CY 2005</th>
<th>CY 2007</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Direct Costs</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Administrative Staff</td>
<td>$3,500</td>
<td>$3,605</td>
</tr>
<tr>
<td>Maintenance Staff</td>
<td>$112,073</td>
<td>$115,435</td>
</tr>
<tr>
<td>Operations Staff</td>
<td>$102,395</td>
<td>$105,467</td>
</tr>
<tr>
<td>Permits</td>
<td>$5,000</td>
<td>$5,150</td>
</tr>
<tr>
<td><strong>Total Direct Cost</strong></td>
<td>$222,968</td>
<td>$229,658</td>
</tr>
<tr>
<td><strong>Indirect Costs</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tractor</td>
<td>$30,000</td>
<td>$30,900</td>
</tr>
<tr>
<td>Loader</td>
<td>$15,000</td>
<td>$15,450</td>
</tr>
<tr>
<td>Spreader</td>
<td>$6,000</td>
<td>$6,180</td>
</tr>
<tr>
<td>Trucks</td>
<td>$60,000</td>
<td>$61,800</td>
</tr>
<tr>
<td><strong>Total Indirect Costs</strong></td>
<td>$111,000</td>
<td>$114,330</td>
</tr>
<tr>
<td><strong>Total Biosolids Application Costs</strong></td>
<td>$333,968</td>
<td>$343,987</td>
</tr>
<tr>
<td><strong>Total Cost</strong></td>
<td>$920,443</td>
<td>$948,057</td>
</tr>
</tbody>
</table>

Unit Costs

- $47.71 per dry ton
- $49.14 per dry ton
- $9.54 per wet ton
- $9.83 per wet ton
LOTT Alliance Biosolids Management Program

Currently, Class B biosolids are produced at the Budd Inlet Wastewater Treatment Plant operated by the Lacey, Olympia, Tumwater, and Thurston County Alliance (LOTT). The plant uses anaerobic digestion and centrifuge dewatering to produce a Class B biosolids cake. In 2006, LOTT produced approximately 5,800 wet tons of biosolids, which were beneficial reused through private contractors. LOTT maintains a long-term contract with a permitted beneficial use facility (BUF), Fire Mountain Farms, Inc. LOTT used to contract with Soil Key, a composting facility in Tenino, Washington, to use LOTT's biosolids as an ingredient for soil composting blends during the winter months until Soil Key went out of business in late 2007.

Fire Mountain Farms, Inc., in Lewis County, is responsible for managing LOTT's biosolids for land application to feed crops and forest lands during a six-month period of April through September. Recycle Services, an affiliate of Harold LeMay Enterprises, Inc., in Centralia, Washington, hauls biosolids to both locations throughout the year. The 2006 annual biosolids management costs are shown in Table 9.

To date, the LOTT biosolids management program has had good public acceptance. Thurston County is currently revising their land use ordinance and is proposing to prohibit or restrict biosolids land application in critical aquifer recharge areas.

<table>
<thead>
<tr>
<th>Contractors</th>
<th>Wet Tons</th>
<th>Rate per Wet Ton</th>
<th>Total Annual Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fire Mountain Farms, Inc.</td>
<td>2,591</td>
<td>$25.31</td>
<td>$65,575</td>
</tr>
<tr>
<td>(land application)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soil Key (composting)</td>
<td>3,199</td>
<td>$24.75</td>
<td>$79,166</td>
</tr>
<tr>
<td>Recycle Services (hauling)</td>
<td>5,790</td>
<td>$11.69 (average rate)</td>
<td>$67,686</td>
</tr>
<tr>
<td><strong>Total Costs</strong></td>
<td></td>
<td><strong>$36.44-$37.00</strong></td>
<td><strong>$212,427</strong></td>
</tr>
<tr>
<td><strong>Unit Cost, average</strong></td>
<td></td>
<td>$168 per dry ton</td>
<td></td>
</tr>
</tbody>
</table>

City of Richland Biosolids Management Program

Biosolids generated at the City of Richland Wastewater Treatment Facility are anaerobically digested and dewatered by belt filter presses. Richland produces approximately 1,500 dry tons of biosolids annually. The Class B biosolids are then hauled to the City-owned landfill approximately eight miles from the wastewater treatment facility. Biosolids are blended with dry land farm soils and wood chips to make a soil amendment, which is used as cover material at the landfill.

As a backup, Richland has permits for applying Class B biosolids to dryland wheat farms through both City-permitted land and through a private contractor. Richland has had good public acceptance of their biosolids program. A summary of the estimated 2007 biosolids management costs for Richland are shown in Table 10.

<table>
<thead>
<tr>
<th>Item</th>
<th>Annual Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hauling¹</td>
<td>$8,000</td>
</tr>
<tr>
<td>Labor²</td>
<td>$70,000</td>
</tr>
<tr>
<td>Equipment³</td>
<td>$36,000</td>
</tr>
<tr>
<td>Land Application</td>
<td>No direct costs</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$114,000</strong></td>
</tr>
</tbody>
</table>

Unit Costs, $/dry ton $76

¹: Includes fuel and maintenance costs; ²: For one FTE; ³: Includes chemical and equipment replacement costs.

City of Walla Walla Biosolids Management Program

The Walla Walla wastewater treatment plant has a capacity of approximately 6 MGD, and is operated by OMI, a private contractor. Walla Walla processes sludge using anaerobic digestion and belt filter press dewatering and produces a Class B biosolids cake.

The City of Walla Walla currently has 5,000 acres permitted for biosolids land application. The City has three major sites permitted for biosolids, all of which are dedicated to growing wheat:

- A landfill expansion area that is the primary land application site with an area of about 938 acres and is approximately two miles from the plant.
- Robinson Ranch, which consists of 3,500 acres of wheat fields and is between five and eight miles from the plant.
- Several small farms that have a total area of 435 acres and are an average of 13 miles from the plant.

In 2006, the City applied 3,206 wet tons (554 dry tons at an average solids concentration of 17 percent) of biosolids to 213 acres at the primary land application site. A total of 283 trips (totaling 2,113 miles; average round trip of 7.5 miles) were needed to haul the solids. The biosolids are hauled in a truck equipped with a 13 yard manure spreader. The truck is loaded with a 3 yard bucket loader.

Table 11 presents Walla Walla’s biosolids management costs.


<table>
<thead>
<tr>
<th>Item</th>
<th>Hauling</th>
<th>Loading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel</td>
<td>$1,647</td>
<td>$1,082</td>
</tr>
<tr>
<td>Maintenance</td>
<td>$733</td>
<td>$648</td>
</tr>
<tr>
<td>Labor</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$2,380</strong> (not including labor)</td>
<td><strong>$1,730</strong> (not including labor)</td>
</tr>
</tbody>
</table>

Unit Costs, $/dry ton $7.42 (not including labor)
City of Coeur d’Alene, Idaho Biosolids Management Program

Coeur d’Alene operates a 6 mgd wastewater treatment plant providing secondary treatment and biological nutrient removal. Coeur d’Alene produces approximately 1,300 dry tons of Class B biosolids annually through anaerobic digestion and centrifuge dewatering. Dewatered cake biosolids are trucked to a nearby City-owned composting facility, where they are composted using the aerated static pile method. The compost meets Class A/EQ biosolids criteria after the composting process. City staffs operate and maintain the composting facility, but a private contractor markets and distributes the final compost. Costs for the Coeur d’Alene biosolids program are shown in Table 12, and a photo of the Coeur d’Alene composting facility is shown in Figure 5.


<table>
<thead>
<tr>
<th>Item</th>
<th>Cost²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annualized Capital for Compost Facility¹</td>
<td>$177,000</td>
</tr>
<tr>
<td>Amendment</td>
<td>$84,000</td>
</tr>
<tr>
<td>Labor, Maintenance, Fuel, Power</td>
<td>$249,000</td>
</tr>
<tr>
<td>Revenue</td>
<td>$28,000</td>
</tr>
<tr>
<td><strong>Total Annual Capital and O&amp;M Costs</strong></td>
<td><strong>$482,000</strong></td>
</tr>
<tr>
<td>Unit Costs, $/dry ton</td>
<td>$370</td>
</tr>
<tr>
<td></td>
<td>$634 (including capital cost)</td>
</tr>
</tbody>
</table>


Figure 5. Photo of Coeur d’Alene, Idaho Aerated Static Pile Composting Facility.

Table 13 presents a summary of the local biosolids programs described in this section. Costs range from $49 to $416 per dry ton (2007 dollars) for biosolids management costs, with Class B biosolids land application on agricultural land being the least expensive and composting being the most expensive.
### Table 13. Summary of Local Biosolids Programs and Costs.

<table>
<thead>
<tr>
<th>Agency</th>
<th>Program Description</th>
<th>Unit Cost (2007 dollars)</th>
</tr>
</thead>
<tbody>
<tr>
<td>City of Spokane</td>
<td>City agricultural land application (Class B)</td>
<td>$49 per dry ton</td>
</tr>
<tr>
<td>City of Richland</td>
<td>Soil manufacturing for landfill cover (Class B)</td>
<td>$76 per dry ton</td>
</tr>
<tr>
<td>LOTT (Olympia area)</td>
<td>Contract agricultural land application (Class B)</td>
<td>$173 per dry ton</td>
</tr>
<tr>
<td>City of Coeur d’Alene, Idaho</td>
<td>City operated composting facility, contract marketing (Class A)</td>
<td>$416 per dry ton</td>
</tr>
</tbody>
</table>
Spokane County Biosolids Markets and Management Alternatives

Many alternatives for solids processing and beneficial use or disposal are available for biosolids management. General market options for biosolids products include agriculture, silviculture, horticulture, and various disposal options including landfills. Table 14 presents the various markets for biosolids products and a relative comparison of costs. Each of the markets is described in the sections that follow. This study assumes that dewatered Class B biosolids will be (1) managed by the County, (2) through a County-administered contract at the SCRWRF, or (3) through a collaborative arrangement with the City of Spokane.

Landfill Disposal

Dewatered biosolids can be disposed of in municipal or private solid waste landfills on a temporary or emergency basis. Typical criteria for acceptance include passing the paint filter test and meeting metals limits.

Dedicated Surface Disposal (Class B)

EPA defines surface disposal, also called dedicated land disposal, as placing biosolids on land for final disposal (EPA, 1994). The key difference between surface disposal and land application (beneficial use) is that the purpose of surface disposal is final disposal without considering the "soil enhancing qualities" of the biosolids. As shown in Figure 6, surface disposal sites can be monofills, surface impoundments, lagoons, dedicated disposal sites, or dedicated beneficial use sites.
Agricultural Fertilization (Class B)

Agricultural land application is the most significant market for biosolids in Washington, particularly in the eastern part of the state. Stabilized biosolids are applied to row or field crops for the purpose of fertilization (Figure 7). The nitrogen, phosphorus, iron, and other trace nutrients in biosolids increase crop yields and reduce the need for inorganic fertilizers. Cake biosolids also add moisture and tilth to agricultural soils.
Silvicultural Fertilization (Class B)

Similar to agriculture, forested lands can be fertilized with biosolids to increase tree yields and growth (Figure 8). Typically, fertilization is limited to harvested land, new starts, and young trees due to difficulties with applying biosolids to more mature forests. Access, terrain, and slopes are key issues when applying biosolids in forests.

Figure 8. Photo of biosolids application onto forests, (courtesy of King County, Washington).

Disturbed Land Reclamation/Rehabilitation (Class B)

Disturbed lands include old mines and gravel pits that lack the topsoil to support vegetation (Figure 9). Land affected by other industry activities or natural disasters can be rehabilitated using biosolids as well. Biosolids can provide topsoil to support vegetation, stabilize slopes, prevent erosion, and potentially restore ecosystems.

Figure 9. Before (l) and after (r) photos showing revegetation after biosolids application, (courtesy of Northwest Biosolids Management Association).
Alternative Intermediate/Final Landfill Cover

Biosolids can be mixed with soil and used as part of intermediate or final landfill cover material (Figure 10).

![Figure 10. Photo of Use of Biosolids for Alternative Cover Amendment, (courtesy of Greater Vancouver Regional District).](image)

Agricultural Fertilization (Class A)

For the purposes of this study, Class A biosolids cake refers to solids that go through a Class A stabilization process and are dewatered. Since SCRWRF biosolids metals concentrations are expected to be below the pollutant concentration limits defined by EPA and the state of Washington, Class A biosolids produced at SCRWRF would also be Exceptional Quality (EQ) and their end use would be unrestricted from a regulatory standpoint unless they were bulk applied.

Producing a Class A/EQ product allows additional uses and opens up certain markets since waiting periods and public access restrictions do not apply, possibly providing an incentive to potential users and thereby expanding local application opportunities.

Public Parks and Recreation Areas (Class A/EQ Compost or Dried Pellets)

Compost has many benefits for soil, including (NBMA):

- Improves drainage and aeration of clay soils, preventing water-logged plants.
- Increases moisture and nutrient holding capacities of sandy soils, and reduced drought damage to plants.
- Keeps nutrients in the soil near plant roots, and it can immobilize and degrade pollutants.
- Prevents crusting on the top of the soil and helping seeds to sprout and water to percolate into the soil.
Table 14. Potential Markets for Spokane County Biosolids.

<table>
<thead>
<tr>
<th>Market</th>
<th>Final Product</th>
<th>Additional Processing</th>
<th>Relative Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Landfill Disposal</td>
<td>Class B Dewatered Biosolids</td>
<td>None</td>
<td>Low</td>
</tr>
<tr>
<td>Dedicated Land Disposal</td>
<td>Class B Dewatered Biosolids</td>
<td>None</td>
<td>Low</td>
</tr>
<tr>
<td>Agriculture: Fertilizer</td>
<td>Class B Dewatered Biosolids</td>
<td>None</td>
<td>Low</td>
</tr>
<tr>
<td>Silviculture: Fertilizer</td>
<td>Class B Dewatered Biosolids</td>
<td>None</td>
<td>Low to Moderate</td>
</tr>
<tr>
<td>Disturbed Land Reclamation/Rehabilitation</td>
<td>Class B Dewatered Biosolids</td>
<td>None</td>
<td>Low</td>
</tr>
<tr>
<td>Alternative Intermediate/Final Landfill Cover</td>
<td>Class A/EQ Dewatered Biosolids</td>
<td>Pasteurization or Advanced Digestion at SCRWRF</td>
<td>Moderate</td>
</tr>
<tr>
<td>Agriculture: Fertilizer</td>
<td>Class A/EQ Dewatered Biosolids</td>
<td>Pasteurization or Advanced Digestion at SCRWRF</td>
<td>Moderate</td>
</tr>
<tr>
<td>Public Parks and Recreation Areas</td>
<td>Class A/EQ Compost or Dried Pellet</td>
<td>Composting or Thermal Drying Process</td>
<td>High</td>
</tr>
<tr>
<td>Horticulture</td>
<td>Class A/EQ Soil Amendment</td>
<td>Pasteurization or Advanced Digestion at SCRWRF, Blending with Amendment Materials</td>
<td>Moderate</td>
</tr>
<tr>
<td>Amendment for Acidic Soils</td>
<td>Class A/EQ Alkaline Soil Amendment</td>
<td>Alkaline Stabilization</td>
<td>Moderate to High</td>
</tr>
<tr>
<td>Golf Course Fertilizer</td>
<td>Class A/EQ Dried Pellet</td>
<td>Thermal Drying Process</td>
<td>High</td>
</tr>
<tr>
<td>Biofuel Feedstock Fertilization</td>
<td>Class B Dewatered Biosolids</td>
<td>None</td>
<td>Low to Moderate</td>
</tr>
<tr>
<td>Direct Energy Production</td>
<td>Class A/EQ Dried Pellet</td>
<td>Thermal Drying Process</td>
<td>High</td>
</tr>
<tr>
<td>Direct Fuel Production</td>
<td>Coal-like Pellet</td>
<td>Proprietary Pyrolysis Process</td>
<td>Very High</td>
</tr>
<tr>
<td>Construction Materials</td>
<td>Glass Aggregate</td>
<td>Vitrification</td>
<td>Extremely High</td>
</tr>
<tr>
<td>Liquid Fuel</td>
<td>Char, Liquid Fuel</td>
<td>Pyrolysis</td>
<td>Very High</td>
</tr>
<tr>
<td>Syn Gas</td>
<td>Char, Syn Gas</td>
<td>Gasification</td>
<td>Very High</td>
</tr>
<tr>
<td>Incineration</td>
<td>Ash</td>
<td>Combustion/Incineriation</td>
<td>High</td>
</tr>
</tbody>
</table>
Compost can be used as organic mulch for residential or commercial gardening and landscaping. Producing Class A/EQ compost from Spokane County biosolids would involve an additional processing step. If operated by the County, it would be necessary to construct a composting facility at a remote site because of space requirements and potential generation of odors. Several private contractors have existing facilities to compost biosolids including:

- Royal Organics in Vantage, Washington
- Glacier Gold in Olney, Montana
- EKO Compost in Lewiston, Idaho

Dried biosolids pellets are similar in particle size to commercial inorganic fertilizers. In the fertilizer industry, the drying process is called “prilling.” Dried pellets are typically 90 to 95 percent solids and have NPK (nitrogen/phosphorus/potassium) ratios similar to the cake biosolids from which they are derived (approximately 6:5:0). Milorganite® is an example of this type of product. Milorganite® is made with dried biosolids from the City of Milwaukee, Wisconsin.

The pellets are produced using a thermal drying process after stabilization of solids (typically anaerobic digestion). There are a number of commercially available systems. Systems that provide a method for particle size classification are preferred due to the market demand for homogeneous particle sizes and dust-free products.

Drying and composting are in relatively common usage. Both result in products that are aesthetically acceptable to the public.

**Horticulture (Class A/EQ Soil Amendment)**

For the nursery and landscaping market, biosolids would be treated with a post-digestion process that would achieve Class A/EQ standards and produce a soil amendment that would have appeal to the general public and the landscape industry. This would be expected to result in a product with value that could be sold. Mulch and potting soil could be created by amending cake biosolids with sand, sawdust, wood chips, or other desirable materials.

**Amendment for Acidic Soils (Class A/EQ Alkaline Soil Amendment)**

Alkaline stabilized biosolids could provide two necessary benefits to agriculture: organic fertilizer and lime to raise the pH of acidic soils. Eastern Washington soils are typically alkaline, although some local pockets of acidic soils do exist east of the Cascades mainly due to heavy fertilization with inorganic fertilizers. Advanced alkaline stabilization refers to use of lime and other heat-producing methods such as the RDP EnVessel Pasteurization system (currently in use at Newport, Oregon), the Schwing Bioset process, the FKC simultaneous dewatering and pasteurization process, and the N-Viro process. The product quality is variable between alternative processes, but all have been successfully marketed and sold in the US.
Golf Course Fertilizer (Class A/EQ Dried Pellet)

Dried biosolids pellets are similar in particle size to commercial inorganic fertilizers. Dried pellets are well-suited to spreading by conventional golf course fertilizer application equipment. Particle size classification is critical for the golf course market.

Biofuel Feedstock Fertilization

Increased interest and demand for biofuels as an alternative to fossil fuels has led to production facilities being sited in Washington and Oregon. Some processes and production facilities use locally grown crops as a feedstock for producing biodiesel and/or ethanol. These crops could be fertilized with cake biosolids, either of Class B or Class A quality.

Published research from Oregon State University (Chastain et al., 2006) has shown that biosolids fertilization of certain oilseed crops can increase yields and reduce irrigation requirements in a similar fashion as biosolids fertilization of other crops. Typically, canola is used as the feedstock for biodiesel production, but research is underway to determine if other crops are more advantageous and economical.

A new biodiesel production facility was recently started in Hoquiam, Washington by Imperium Renewables. The facility will be accepting canola fertilized with biosolids from Natural Selection Farms in Sunnyside, Washington. Seattle Biodiesel, a subsidiary of Imperium, already operates the Northwest's first commercial refinery, producing 5 million gallons a year of biodiesel. Natural Selection Farms is also planning to construct a biodiesel production facility at the Port of Sunnyside.

Central Washington biodiesel has a production facility in Ellensburg that uses locally grown oilseed crops and fryer oil as feedstock. The facility will eventually have the capacity to produce five million gallons of biodiesel annually. Columbia Bio-Energy produces biodiesel from canola and soybean oil in Creston, Washington.

A portion of the City of Portland’s biosolids are used to fertilize canola crops at Madison Farms in eastern Oregon. Part of the oil that is produced is processed into biodiesel on-site to run farm machinery, and the remainder will be sent to Sequential-Pacific (Salem, Oregon) for processing.

The economics of biosolids management on canola or other oilseed crops are not well defined. Biosolids provide fertilizer to crops as a replacement for commercial products.

King County, Washington recently announced a program under which biosolids from their wastewater treatment facilities will be applied as fertilizer to canola fields near Yakima, Washington. Oil from that crop will be processed into biodiesel that will be used by buses in Seattle’s Metro transit system.

Another potential biofuel opportunity involves production of ethanol from cellulosic materials. In the Pacific Northwest, switchgrass is a native plant that shows good promise for being a feasible feed material for ethanol production.

Glass Aggregate Production

Vitrification is the process of melting waste materials at high temperatures, and was developed as an alternative for managing nuclear waste. Dried (>90% solids) biosolids are combusted in an oxygen-rich atmosphere at temperatures of 2400° to 2700° F. This
results in complete destruction of organic material, and the residue melts to form molten glass. The glass has a number of potential uses, such as sandblasting grit, asphalt paving, or roofing shingle granules. Besides total elimination of pathogens and toxic organics, the process is said to permanently immobilize potentially toxic metals.

This is considered an “innovative” technology, and has been tested on several biosolids samples in a demonstration facility in Winneconne, Wisconsin using the “GlassPack®” system from Minergy Corporation. The first permanent full-scale facility went into operation in September 2006 in Zion, Illinois. This system has a capacity of 187 wet tons/day (at 17-20% solids), and will process biosolids from the North Shore Sanitary District’s three treatment plants. From an input of 35 dry tons per day, the facility will generate about 7.5 tons/day of glass aggregate. A schematic of the facility is shown in Figure 11.

The process is a form of incineration, but there are technical differences from conventional systems. The obvious difference is the production of usable glass aggregate rather than a waste ash that is typically discarded in a landfill. This occurs as a result of the significantly higher temperatures in the combustion chamber. Another difference is the use of a closed loop gas system in which most exhaust is recycled back to the fluidized bed dryer. This reduces the system exhaust to a relatively low level. This is made possible by the use of the oxygen injection system that provides the oxygen needed for combustion.

![NSSD GlassPack® Operation Layout](image)

![Minergy® GlassPack® Facility Schematic (l) and Photo of Zion, Illinois Facility (r) (Courtesy of Minergy®).](image)

**Figure 11.** Minergy® GlassPack® Facility Schematic (l) and Photo of Zion, Illinois Facility (r) (Courtesy of Minergy®).

**Solid Fuel (Coal Alternative) Production**

This option includes various means of using the inherent heating value in biosolids to create usable energy. Several private firms have begun to offer biosolids management services through their proprietary biosolids-to-energy processes. Some offer management at their own facility, which eliminates the need to find a site for a facility and finance capital improvements. Two such vendors are described below.
EnerTech

EnerTech is constructing a large facility using a different proprietary process in Rialto, California. The SlurryCarb™ system uses heat and pressure to treat biosolids cake to carbonize the organic matter, which results in a release of bound water. The slurry is dewatered to about 50 percent solids in a centrifuge, and then dried to greater than 90 percent solids. The final product, called “E-Fuel”, is said to be equivalent to coal as a fuel source for such uses as cement kilns, boilers, gasifiers, and fluidized beds. A schematic of the process is shown in Figure 12.

The facility is privately owned and financed, and long-term contracts are required for biosolids management. Contracts have been signed with several wastewater agencies, mostly large agencies producing significantly more biosolids than will be produced by Spokane County.

![Schematic of EnerTech SlurryCarb™ Process](image)

**Figure 12. Schematic of EnerTech SlurryCarb™ Process (Courtesy of EnerTech).**

Cement Kilns

The second option is based on sending dried cake to a cement kiln, where it would be used for fuel. It also provides benefits by reducing nitrous oxide (Nox) emissions. It is possible that there are potential other industrial users in the vicinity. The treatment process is thermal drying, so the dried product would have value as a fertilizer and soil amendment as long as the digestion process was maintained.

Liquid Fuel/Syn Gas Production

This option includes various means of using the inherent heating value in biosolids to create usable energy. There are two possible processes:

- Pyrolysis
- Gasification
Pyrolysis
Pyrolysis chemically converts complex organic molecules to simpler molecules using heat treatment in the absence of oxygen. Drying is a required pretreatment step for medium and high temperature pyrolysis, but not for low temperature pyrolysis. Depending on the type of pyrolysis, the biosolids convert to gas, liquid or oil, and char. Recycle and waste streams contain high concentrations of contamination requiring industrial treatment systems. Some of the intrinsic heating value of the biosolids is lost in pyrolysis. For low temperature pyrolysis, the partial loss in heating value is partly or wholly recovered in improved mechanical dewaterability of the product. The product streams are rich with energy, however, and may be used in a burner or electricity generator. The net energy yield from pyrolysis varies from negative to slightly positive.

A number of different pyrolysis configurations are marketed by various suppliers. In some systems, dewatered biosolids are reacted at elevated temperatures and pressures generating gas, liquid and solid products that require further refinement. Water is liberated from the biosolids with this type of pyrolysis, and mechanical dewatering downstream of the reactor results in a cake that is up to 50 percent solids. Other pyrolysis systems treat dried biosolids in a high temperature chamber to produce a gas, solid and oil. The products generated by pyrolysis systems are useful as an energy supply to support the equipment. A net positive energy output is possible if the input biosolids contain adequate energy potential, and energy recovery is incorporated into the system to improve efficiency. The results of the energy balance depend on the water content of the input biosolids and the level of waste or recycle stream treatment required. Waste gas from pyrolysis systems may contain ammonia, thiols, hydrogen sulfide, carbon dioxide, methane and other non-methane organic compounds. Wastewater from pyrolysis may contain high concentrations of ammonia, biochemical oxygen demand (CBOD₅), total dissolved solids (TDS) and metal compounds. The output solids (char) may be marketed for use as a low-grade energy source, supplied for use in industrial processes, or disposed of in a landfill.

Gasification
Pyrolysis solids or char are amenable to further processing and conversion into a fuel gas or a syngas. Using starved air combustion, organic molecules are converted to hydrogen gas, carbon monoxide gas, and other minor gas constituents. Syngas typically has a heating value between 125 and 350 BTU per cubic foot. The gasification process relies on exothermic reactions making the process self-sustaining. Post treatment of the syngas removes corrosive compounds and dries the gas prior to use in gas turbines, boilers, and internal combustion engines. Slag and other metals are residual waste products. Waste flue gas requires monitoring and treatment to control pollutant discharge. Wastewater treatment is necessary for scrubber blowdown if wet scrubbers are used for syngas treatment or waste gas pollution control.

Incineration
Incineration is combustion at high temperatures in the presence of oxygen. The organic portion of biosolids can be combusted. Organic matter, which is approximately 70 to 85 percent of the solids, is removed and the material left is inert inorganic ash. The ash is typically disposed of in a landfill, but can be recycled in construction materials such as concrete.
Typically, raw (undigested) solids are combusted as digestion reduces the heat energy value of the solids, decreases the dewaterability of the solids, and increases costs for processing.

Federal and Washington state air emissions requirements for sewage sludge incinerators include limits on heavy metals, carbon monoxide or total hydrocarbons, and other organic compounds. There are also required management practices such as temperature and instrument maintenance and operating conditions for air pollution control equipment. The Spokane Regional Clean Air Agency is the local air quality regulatory authority for air emissions.

**Alternatives Screening and Elimination**

Many of the alternatives listed in Table 14 are not applicable to Spokane County for any of the following reasons:

- Alternative is not allowed under federal or state regulations.
- Alternative is not consistent with the 2006 FPA goals or values.
- Alternative has a limited market for biosolids product or disposal outlet.
- Alternative has permitting challenges.
- Alternative uses embryonic technology that is not established in the industry.
- Alternative is very expensive compared to other biosolids management alternatives.

The following sections discuss the eliminated alternatives and the reasons why they will not be considered further.

**Landfill Disposal**

Chapter 173-308 of the WAC requires that biosolids not be disposed of in a landfill except on a temporary or emergency basis. For biosolids to be disposed in a landfill on a long term basis, several requirements must be met:

- Authorization in an NPDES permit or state waste discharge permit; and
- Submit an evaluation of “the various management options that demonstrates to the satisfaction of the department that options for beneficial use are economically infeasible” for Ecology approval.

Since there are economical biosolids management options for the County for the foreseeable future, long-term landfill disposal is not an option of interest. As a backup in an emergency, it is feasible to dispose of biosolids in a landfill.

**Dedicated Surface Disposal**

Dedicated land disposal would most likely require land purchase by the County and would not take advantage of the beneficial properties of biosolids produced at the SCRWRF. This option is eliminated from further consideration.
Amendment for Acidic Soils (Alkaline Stabilization)

In general, alkaline stabilized biosolids are not a desired product in eastern Washington due to the already alkaline local soils, and is therefore eliminated.

Vitrification (Glass Aggregate Production)

The vitrification process is highly complex and would involve high capital and energy costs. The front end process includes a dryer, as discussed under other options. Going beyond that point with the vitrification system would add significant cost with little or no benefit. The amount of product created would be small, with little value. It is essentially an incineration process conducted at very high temperatures, so permitting for air emissions may be challenging. Lastly, the technology has been developed only on a trial basis for biosolids. This option will be eliminated from further consideration.

Solid Fuel (Coal Alternative)

The only full-scale facility using the SlurryCarb™ process is privately owned and financed, and long-term contracts are required for biosolids management. Most contracts are with large agencies producing significantly more biosolids than will be produced by Spokane County. Contract costs per dry ton of biosolids processed are more than double the expected cost for Class B agricultural land application. Therefore, this option is eliminated from further consideration.

Liquid Fuel/Syn Gas Production

Medium and high-temperature pyrolysis and gasification processes have limited full-scale operating experience and processing costs are very high. These processes have been more successful with municipal solid waste and other organic waste with lower moisture content than municipal biosolids. Due to high cost and limited operating experience, this alternative will not be considered further.

Incineration

Incineration combuts the organic carbon, nitrogen, and other nutrients that are critical to beneficially reusing biosolids. Therefore, incineration does not meet the County’s goal of beneficially reusing all biosolids produced at the SCRWRF.

Obtaining an air emissions permit for a sewage sludge incinerator is very difficult in urban and suburban areas due to strict air quality requirements and generally negative public perception. While certain incineration processes can be relatively cost effective, the process is not consistent with the solids handling process at SCRWRF as proposed in neither the 2007 Primary Design Document nor the specifications of the Request for Proposals (RFP) for design-build-operate (DBO) firms. Therefore, incineration will not be considered further.
Final Alternatives

Table 15 lists all of the biosolids management alternatives considered for Spokane County. The remaining alternatives are grouped into six categories for further evaluation. Some have suboptions relating to whether the processing will be performed by the County or by a private contractor. Other suboptions are related to the location of the processing or application site.

Table 15. Biosolids Management Alternatives for Spokane County.

<table>
<thead>
<tr>
<th>Considered Not Feasible</th>
<th>Final Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Landfill Disposal</td>
<td>Agricultural Fertilization</td>
</tr>
<tr>
<td>Dedicated Land Disposal</td>
<td>Alternative Landfill Cover</td>
</tr>
<tr>
<td>Chemical Stabilization/Acidic Soil Amendment</td>
<td>Disturbed Land Reclamation/Rehabilitation</td>
</tr>
<tr>
<td>Incineration</td>
<td>Forest Fertilization</td>
</tr>
<tr>
<td>Glass Aggregate</td>
<td>Compost Production</td>
</tr>
<tr>
<td>Liquid Fuel/Syn Gas</td>
<td>Dried Pellet Production</td>
</tr>
<tr>
<td>Solid Fuel (Coal Alternative)</td>
<td></td>
</tr>
</tbody>
</table>

Alternative 1: Agricultural Fertilization

As stated in previous planning documents, the County will not apply biosolids to land over or in the vicinity of the Spokane Valley - Rathdrum aquifer. Table 16 presents the major commodity crops grown in Spokane County. Winter wheat is the most cultivated crop in the County. Typical agronomic loading rates for wheat vary from 75 to 120 lbs nitrogen per acre. Current Spokane County biosolids production will fertilize approximately 4 percent of winter wheat grown in County or 1.2 percent of major commodities grown in County.

Table 16. Spokane County Agricultural Data for Calendar Year 2006 (USDA).

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Agronomic Rate (lbs N/acre/yr)</th>
<th>Harvested (acres)</th>
<th>Nitrogen Demand (tons/yr)</th>
<th>Potential Biosolids Demand (dry tons/yr)¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Winter Wheat</td>
<td>75</td>
<td>93,000</td>
<td>3,488</td>
<td>58,125</td>
</tr>
<tr>
<td>Spring Wheat</td>
<td>75</td>
<td>44,500</td>
<td>1,669</td>
<td>27,813</td>
</tr>
<tr>
<td>Barley</td>
<td>120</td>
<td>19,000</td>
<td>1,140</td>
<td>19,000</td>
</tr>
<tr>
<td>Hay</td>
<td>120</td>
<td>50,500</td>
<td>3,030</td>
<td>50,500</td>
</tr>
<tr>
<td>Total</td>
<td>---</td>
<td>210,600</td>
<td>9,326</td>
<td>155,438</td>
</tr>
</tbody>
</table>

1. Assumes that biosolids produced at SCRWRF are six percent nitrogen.

The emphasis on renewable energy and energy independence by both the federal and state governments has created new opportunities for the biofuels market. Washington state law requires that by the end of 2008 at least two percent of the gasoline sold in the state be an ethanol blend and at least two percent of the diesel sold in the state be a biodiesel blend. Additionally, the law requires that by June 2009, at least 20 percent of the diesel used in state vehicles be biodiesel (Washington Department of Agriculture website).
The Washington State Department of Agriculture issued low-interest loans totaling $13 million to assist five energy projects through the Energy Freedom Loan program. Several of the funded projects are in central and eastern Washington and one is in the Spokane area (Washington Department of Agriculture website):

- Port of Warden is partnered with Washington Biodiesel to construct an integrated oilseed crushing and biodiesel production facility.
- Spokane County Conservation District is working with Palouse-Bio, LLC to construct an oilseed crushing and biodiesel production facility.
- Port of Sunnyside is working with Natural Selection Farms on an oilseed crushing facility to produce oil that will be used in biodiesel production.
- Odessa Public Development Authority partnered with Inland Empire Oilseeds on an oilseed crushing and biodiesel refining facility.

According to the USDA’s Risk Management Agency (RMA), standard actual production history (APH) insurance policies are available for growing canola in Spokane County and all Washington counties adjacent to Spokane County. This has been a key drawback for farmers in the past, but now reduces the risk associated with growing oilseed crops.

As mentioned, some farmers are already growing canola, and at least one inland northwest farmer has constructed an oilseed crushing facility (Madison, 2007). Current economics dictate that the breakeven point for farmers is approximately $0.1136 per gallon of canola oil. With current canola agronomics, yields, and a market price of $0.12 per gallon of canola oil, profits are significantly less than for wheat. Until canola yields and canola oil prices increase, or subsidies are given to farmers, this biosolids management alternative may not be feasible. However, if the County invests in research on canola agronomics and provides a subsidy to local farmers for growing canola, this alternative may be feasible.

Agricultural land application could be implemented in three ways:

1A County managed program with County permitting, transportation, and application
1B County managed program with contractor permitting, siting, and operations
1C Partnership with the City of Spokane

**Alternative 1A: County Management**

The County would be required to identify and permit individual land application sites. This could create competition between the City and the County for sites depending on location, but it is unlikely that this will be an issue. Ecology does not allow a site to be permitted for biosolids land application by multiple agencies.

There is a large agricultural region south of Spokane, some within the County and some in neighboring counties. If this sub-alternative is pursued, the County intends to target farms in this area.

**Alternative 1B: Public-Private Partnership**

The County would manage a contract with a third party biosolids management firm in Alternative 1B. The contractor would be paid to permit, haul, and apply biosolids to...
agricultural land. A variety of biosolids management contractors could manage the County’s program effectively, including the firm selected to design, build, and operate SCRWRF.

Boulder Park, Inc. has permitted biosolids land application sites in Douglas County and has expressed interest in managing Spokane County’s biosolids.

Natural Selection Farms, Inc. is an Ecology-permitted Beneficial Use Facility (BUF) located in the Sunnyside area. Natural Selection Farms manages a large quantity of biosolids from Washington municipal wastewater agencies.

K&S Madison, Inc. owns and operates Madison Farms near Echo, Oregon. Madison accepts biosolids from several large Portland area municipalities for application onto dryland grain crops.

**Alternative 1C: Partnership with the City of Spokane**

The biosolids management program would be managed by the City of Spokane, similar to the current agreement for wastewater treatment. The City has indicated in preliminary discussions that their preference is for the County to transport biosolids from the SCRWRF to the City’s permitted land application sites and unload the biosolids at either a storage pad (winter) or onto the land directly. County trucks and drivers or a contract hauler could be used for transportation. The City would then either store or land apply the biosolids. A key to Alternative 1C is an equitable partnership and cost sharing with the City.

**Alternative 2: Alternative Landfill Cover (Class B)**

Several local and regional landfills were identified in a preliminary investigation as possible partners in an alternative landfill cover application:

- **2A** Roosevelt Regional Landfill
- **2B** Kootenai County (Idaho) Fighting Creek Landfill
- **2C** Graham Road Landfill
- **2D** City of Ephrata Landfill

**Alternative 2A: Roosevelt Regional Landfill**

Rabanco manages the Roosevelt Regional Landfill in Roosevelt, Washington, which is approximately 200 miles from Spokane near the Columbia River. Rabanco plans to utilize the landfill for another five years or so and then begin placing final cover material on some sections for closure. Currently, Rabanco has adequate intermediate cover material and is not seeking additional organic or alternative intermediate cover.

**Alternative 2B: Kootenai County (Idaho) Fighting Creek Landfill**

Kootenai County, Idaho operates a municipal solid waste landfill south of the City of Coeur d’Alene called the Fighting Creek landfill. It is approximately 30 miles east of the SCRWRF site. The County Solid Waste Division stated via telephone that they have approximately ten years worth of clay cover material from excavation of the landfill. They are not interested in other cover materials at this time.
 Alternative 2C: Graham Road Landfill
The Graham Road landfill is operated by Waste Management Inc. and is located near the west service entrance of the Fairchild Air Force Base approximately 16 miles west of the SCRWRF site. The landfill is a limited purpose landfill accepting primarily demolition and construction waste, non-hazardous industrial waste, but not municipal solid waste. Graham Road’s superintendent indicated over the phone that the standard tipping fee is approximately 25 dollars per ton, but that no alternative cover material is needed at the landfill at this time.

 Alternative 2D: Ephrata Landfill
The City of Ephrata, Washington and Grant County are under an agreed order (AO) to voluntarily clean up the Ephrata landfill. The original landfill is unlined and was operated until 2005, when a new lined cell opened. Discussions with Ecology revealed that the Ephrata landfill will be undergoing closure activities over the next year or two. Given that the SCRWRF will not begin producing biosolids until mid-2012, there will not be a need for biosolids as a cover material at the Ephrata landfill after SCRWRF startup.

 Alternative 3: Reclamation/Restoration (Class B)
Key opportunities for reclamation or revegetation of disturbed lands near Spokane are the mining lands and gravel pits in the area, including:

  3A Silver Valley mines
  3B Other future reclamation

 Alternative 3A: Silver Valley mines
The Silver Valley is a mining area that runs along I-90 in northern Idaho approximately 90 miles east of Spokane. Discussions were held with the Hecla Mining Company about their Lucky Friday mine near Mullan, Idaho. Hecla stated that they did not have a need for organic material for restoration at this time but would potentially be interested in the future for closure activities.

 Alternative 3B: Other Future Reclamation
No other specific projects for reclamation or restoration were identified at this time. However, future opportunities may arise as the result of mine, gravel pit, or landfill closure activities in the area.

 Alternative 4: Forestry Application
Several private firms own large forest land areas near Spokane. The following three were identified as possible partners and were contacted directly:

  4A Inland Empire Paper
  4B Stimson Lumber
  4C Forest Capital Partners
Alternative 4A: Inland Empire Paper

Discussions with Inland Empire Paper (IEP) were held via telephone. IEP stated that they were not interested in fertilization of their forested lands with biosolids. This is a company policy and is not expected to change. In addition, the topography of the IEP forest lands is generally unsuitable for forest application of biosolids.

Alternative 4B: Stimson Lumber

Stimson Lumber owns several thousand acres of forest land in Spokane County. Stimson’s Washington state resource manager was contacted via telephone to discuss biosolids application onto the company’s forest lands in the County. The resource manager stated that the company was not interested in biosolids and would likely not be interested in the future. Stimson does not have experience with biosolids fertilization of forests.

Alternative 4C: Forest Capital Partners

Forest Capital has forest holdings north of Spokane in both Spokane and Stevens Counties. The forester in charge expressed interest in biosolids application.

An analysis of land owned by Forest Capital in Spokane County was conducted to determine if a significant portion could be fertilized with biosolids. Characteristics evaluated included topography, distance to surface waters, and distance to access roads. It was concluded that the vast majority of the Forest Capital land in Spokane County was unsuitable for biosolids application due to steep slopes and lack of access.

Alternative 5: Composting (Class A/EQ)

Compost could be produced at a new County facility or at a privately-run facility. Alternative arrangements for owning and operating a composting facility, and marketing and managing the compost are as follows:

5A County-operated composting facility

5B Contractor composting

5B1. Truck to Royal Organics for composting

5B2. Rail/truck to Glacier Gold for composting

5B3. Rail/truck to EKO for composting

5B4. DBO firm

5B5. Future local contractor facility

5C Co-composting with County yard waste

Alternative 5A: County-Operated Composting Facility

A County-operated composting facility would require that a facility be sited and land be purchased or leased. A composting facility should be as close as possible to the SCRWRF to minimize transportation costs. An undeveloped area is desired, preferably in an area zoned agricultural or industrial, remote from residential development, and with a buffer around the perimeter. County-produced compost could be marketed in bulk to the public or sold to commercial industries such as nurseries. Revenue would be
determined by seasonal demand, product quality, and competing products. In the public responses to a survey associated with the Wastewater Facilities Plan, there was strong interest in a County-produced compost. A leading fertilizer broker also stated that there is strong demand for compost in the Spokane area. Contingent on product quality, this broker would be interested in a contract for marketing and distribution of County-produced compost.

**Alternative 5B: Public-Private Partnership**

Several private contractors in the region manage organic residuals for municipalities and private industries. Several were identified and contacted to discuss the possibility of a partnership:

**5B1 - Royal Organics Composting**

Royal Organics indicated via telephone that they do not have a permit to process biosolids at their facility in Vantage, Washington. They may pursue a permit to become a Beneficial Use Facility (BUF) in the future depending on their ability to obtain contracts from biosolids producers. Currently, the yard debris from the Spokane County solid waste system is trucked to Royal Organics for composting.

**5B2 - Glacier Gold Composting**

Glacier Gold indicated that they have no available capacity at their facility in Kalispell, Montana, which is approximately 240 driving miles from Spokane. At this time the facility capacity has been exceeded and they have historically had a significant backlog of material. Glacier Gold is considering locating a new facility in Eureka, Montana, which is approximately 230 miles from Spokane.

**5B3 - EKO Composting**

EKO has a composting facility in Lewiston, Idaho, which is approximately 105 driving miles south from Spokane. EKO’s facility in Lewiston, Idaho is at capacity, and some current contract obligations are being fulfilled at their Missoula, Montana facility. EKO’s Missoula facility stated that they are at capacity and will not accept any new biosolids customers at this time. EKO has preliminary plans to expand this facility at an indefinite future date.

**5B4 – DBO Firm Partnership**

A separate contract or a contract amendment could be issued to the selected DBO firm for biosolids composting.

**5B5 – Future Local Contractor Composting Facility**

Since the SCRWRF will not be operational until mid-2012, the County could provide incentives to an established or new contract compost operator to construct a composting facility near the SCRWRF. Incentives could include assistance with permitting, a long-term contract, and an attractive tipping fee.
Alternative 5C: Co-Composting with County Yard Waste

As discussed above, Spokane County’s Solid Waste Division is currently contracting with Royal Organics for yard waste composting. The Solid Waste Division has suggested a co-composting program where biosolids would be combined with the County’s yard waste. The County’s contract hauler recently increased hauling fees to cover significantly increasing fuel costs and the County is considering other options for yard waste management.

Alternative 6: Dried Pellet Production (Class A/EQ)

Nurseries, golf courses, and some public agencies are the typical customers for pelletized biosolids fertilizer. Other key markets are fertilizer brokers, who buy bulk quantities of fertilizers and sell or blend with other fertilizers for various markets. Discussions with Wilbur Ellis, the leading supplier of commercial fertilizer in the Spokane area, revealed that there is only a very small market for dried pellets. Wilbur Ellis indicated that they only sell approximately two tons of similar fertilizer per season.

Golf courses in the Spokane area are listed in Table 17 along with an estimate of their nitrogen demand. There appears to be sufficient nitrogen demand from area golf courses to meet all SCRWRF biosolids production at facility startup. This assumes that all listed golf courses would purchase or accept biosolids as their only fertilizer.

Two courses were surveyed via telephone regarding fertilization practices. Both used commercial inorganic fertilizers on the majority of their respective golf courses. Neither expressed interest in biosolids due to unfamiliarity, higher materials handling and labor costs than inorganic fertilizer application, and satisfaction with their current fertilizer.

Public agencies such as parks and recreation departments, school maintenance departments, and state parks often fertilize athletic fields and other turf areas. Dried biosolids pellets can often be spread in the same equipment used to spread inorganic fertilizers. Typically, lower nitrogen concentrations in biosolids require that more biosolids be handled than higher nitrogen content inorganic fertilizers. For most public agencies, cost is one of the most important considerations in selecting a fertilizer. If the County could provide a low-cost dried biosolids pellet product, public agencies are potential customers. Table 18 shows a list of state, county, and city parks in Spokane County.
Table 17. Spokane Area Golf Course Fertilization and Market Analysis.

<table>
<thead>
<tr>
<th>Name</th>
<th>Total Acres</th>
<th>Irrigable Acres</th>
<th>Playable/Fertilized Acres&lt;sup&gt;1&lt;/sup&gt;</th>
<th>Biosolids Market Potential (dry tons/year)&lt;sup&gt;2&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indian Canyon Golf Course</td>
<td>210</td>
<td>205</td>
<td>179</td>
<td>616</td>
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<tr>
<td>Spokane Country Club</td>
<td>188</td>
<td>184</td>
<td>160</td>
<td>551</td>
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<tr>
<td>Hangman Valley Golf Course</td>
<td>174</td>
<td>171</td>
<td>148</td>
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<td>Esmeralda Golf Course</td>
<td>165</td>
<td>162</td>
<td>140</td>
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<tr>
<td>Wandermere Golf Course</td>
<td>159</td>
<td>156</td>
<td>135</td>
<td>466</td>
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<tr>
<td>Downriver Golf Course</td>
<td>158</td>
<td>155</td>
<td>134</td>
<td>463</td>
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<td>Manito Golf Club</td>
<td>139</td>
<td>136</td>
<td>118</td>
<td>408</td>
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<td>The Creek at Qualchan Golf Course</td>
<td>138</td>
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<td>405</td>
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<td>Meadow Wood Golf Course</td>
<td>144</td>
<td>141</td>
<td>122</td>
<td>422</td>
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<td>Liberty Lake Golf Course</td>
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<td>123</td>
<td>106</td>
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<tr>
<td>Painted Hills Golf Course</td>
<td>89</td>
<td>87</td>
<td>76</td>
<td>261</td>
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<td>Sundance Golf Course Inc.</td>
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<td>85</td>
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<td>Valley View Golf Course</td>
<td>61</td>
<td>60</td>
<td>52</td>
<td>179</td>
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<td><strong>Total</strong></td>
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<td><strong>1,800</strong></td>
<td><strong>1,563</strong></td>
<td><strong>5,388</strong></td>
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</tbody>
</table>

<sup>1</sup> Assumes 85% of total acres are fertilized.

<sup>2</sup> Assumes an average fertilizer application rate of 9.5 lb N/1,000 sf and a biosolids nitrogen concentration of 6%.

Table 18. Potential Biosolids Demand at Public Parks in Spokane County.

<table>
<thead>
<tr>
<th>Name</th>
<th>Agency</th>
<th>Area( acres)</th>
<th>Estimated Area Fertilized ( acres)</th>
<th>Nitrogen demand (lb/yr)</th>
<th>Potential Biosolids Demand (dry tons/yr)</th>
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<tr>
<td>Mt. Spokane State Park</td>
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<td>Riverside</td>
<td>State</td>
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<tr>
<td>Name</td>
<td>Agency</td>
<td>Area (acres)</td>
<td>Estimated Area Fertilized (acres)</td>
<td>Nitrogen demand (lb/yr)</td>
<td>Potential Biosolids Demand (dry tons/yr)</td>
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<td>--------------</td>
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<td>State Park</td>
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<tr>
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<td>Holmberg</td>
<td>County</td>
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<td>Linwood</td>
<td>County</td>
<td>7</td>
<td>2</td>
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<td>Orchard Avenue</td>
<td>County</td>
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<td>A.M. Cannon</td>
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<td>Audubon</td>
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<tr>
<td>Name</td>
<td>Agency</td>
<td>Area (acres)</td>
<td>Estimated Area Fertilized (acres)</td>
<td>Nitrogen demand (lb/yr)</td>
<td>Potential Biosolids Demand (dry tons/yr)</td>
</tr>
<tr>
<td>-----------------------</td>
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<tr>
<td>Southside Sports Complex</td>
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<td>Wentel Grant</td>
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<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>27,715</strong></td>
<td><strong>133</strong></td>
<td><strong>57,733</strong></td>
<td><strong>481</strong></td>
</tr>
</tbody>
</table>

1. Assumes a fertilizer application rate of 10 lb N/1,000 sf.
2. Assumes a biosolids nitrogen concentration of 6%.

State – Washington state
County – Spokane County
City – City of Spokane

Table 19 summarizes the market analysis for dried biosolids pellets. The level of analysis required to assess the sod and seed farm market is beyond the scope of this study. Preliminary investigations indicate that this market is characterized by relatively small farms and each farm purchases fertilizer individually.

The drying facility could be located at the SCRWRF since an area of approximately 5,000 square feet would be required. This would allow the use of digester gas for the drying process and minimize the transportation of cake biosolids. Locating a facility offsite would require land purchase and could be lengthy depending on public comments, the environmental review and permitting process, and obtaining a conditional use permit. Other disadvantages of an offsite drying facility include most likely losing the capability to use SCRWRF’s digester gas to fuel the process and increased costs for hauling and handling cake biosolids.

**Table 19. Summary of Dried Pellet Market Analysis for Spokane County Area.**

<table>
<thead>
<tr>
<th>Market</th>
<th>Potential Biosolids Demand (dry tons/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Golf Courses</td>
<td>5,388</td>
</tr>
<tr>
<td>Public Parks and Recreation Areas</td>
<td>481</td>
</tr>
<tr>
<td>Sod and Seed Farms</td>
<td>Unknown</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>5,869</td>
</tr>
</tbody>
</table>

Implementation of a dried pellet program could be done in three ways:

- **6A** County operated drying facility at the SCRWRF
- **6B** addition to the selected DBO firm’s contract for designing, building, and operating a thermal drying facility at the SCRWRF or at an offsite location
- **6C** another public-private partnership with a third party. Project delivery could be DBO or traditional design-bid-build
Alternative 6A: County-Operated Drying Facility
The sub-alternative would require hiring County operators and maintenance staff for the drying facility. Approximately three full time equivalents (FTEs) would be required.

Alternative 6B: DBO Firm Amendment
If the selected DBO firm has experience with thermal drying processes and facilities, an amendment could be negotiated to design, build, and operate such a facility at the SCRWRF. This delivery would most likely require the least amount of effort since the DBO firm would already have operations and maintenance staff at the SCRWRF, and the County would already have a contract negotiated.

Alternative 6C: Public-Private Partnership
Several private contractors manage organic residuals for municipalities and private industries, including Synagro and New England Fertilizer Company (NEFCO). Both have delivered projects on a DBO basis and have several operating facilities around the country.
Alternatives Analysis

In this section, final alternatives are evaluated on life cycle costs and non-cost criteria such as social and environmental benefits and drawbacks.

Life-Cycle Cost Evaluation

Life cycle cost estimates were developed for the six final alternatives and are presented in Table 20. Costs are for initial startup of the SCRWRF, which is estimated to receive an annual average of 8 mgd of wastewater at the beginning of operations. At startup, an average of 1,880 dry tons of biosolids is expected to be produced annually. Costs are normalized to the quantity of dry tons produced to facilitate comparisons with other local biosolids management programs described in previous sections. The values presented in Table 20 are “order of magnitude” estimates. The Project Management Institute (PMI) defines “order of magnitude” cost estimates as between 80 and 180 percent of actual project costs.

Non-Cost Evaluation

The following non-cost criteria were identified in workshops with County staff, the Board of Commissioners, Ecology, environmental groups, and the general public:

- Environmental Impact/Sustainability – this is a measure of the impact on pollution, fossil fuel use, and other environmental impacts.
- Risk – this is a measure of the amount of previous industry and local experience with the management alternative, the local market for the end product, and the susceptibility to future regulatory changes.
- Reliability/Diversification – this is a measure of the ability of the management alternative to integrate with other secondary alternatives and will be discussed in the sections that follow.
- Public Perception – this is a measure of previous experience with the opinion of the general public about this management option as shown in responses to the January 2001 public meeting and other local municipality’s experiences.
- Integration with SCRWRF Facilities – this is a measure of whether or not additional facilities are required for the management alternative and how any additional facilities will fit within the SCRWRF site.

Table 21 presents an evaluation of the above criteria in comparison to other alternatives. This table may be revised based on input received at the April 17, 2008 public meeting.
Table 20. Estimate of Probable Life Cycle Costs for Final Biosolids Management Alternatives.

<table>
<thead>
<tr>
<th></th>
<th>Alt 1</th>
<th>Alt 2</th>
<th>Alt 3</th>
<th>Alt 4</th>
<th>Alt 5</th>
<th>Alt 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural Fertilization</td>
<td>$0.5</td>
<td>$0.6</td>
<td>$0.6</td>
<td>$0.7</td>
<td>$7.9</td>
<td>$10.3</td>
</tr>
<tr>
<td>Landfill Cover Amendment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reclamation/Restoration</td>
<td>$22</td>
<td>$30</td>
<td>$30</td>
<td>$33</td>
<td>$368</td>
<td>$479</td>
</tr>
<tr>
<td>Forest Fertilization</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Composting</td>
<td>$90</td>
<td>$138</td>
<td>$223</td>
<td>$138</td>
<td>$271</td>
<td>$255</td>
</tr>
<tr>
<td>Dried Pellet Production</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Capital costs are in millions ($1,000,000).  
2. Assumes 1,880 dry tons per year  
3. Assumes a 6 percent discount rate and a 20-year period.  
4. Assumes County-operated program (Alternative 1A); assumes an average one-way haul distance of 30 miles.  
5. Assumes an average one-way haul distance of 60 miles.  
6. Assumes an average one-way haul distance of 90 miles.  
7. Assumes a County-operated aerated static pile composting facility not located at the SCRWRF.  
8. Assumes a County-operated rotary drum direct drying process located at the SCRWRF.  
9. Assumes 40,000 equivalent dwelling units (EDUs) connected to sewer system. Charge shown is for biosolids management only, and does not include base rates for any SCRWRF facilities (including solids handling) or any other component of the sewer rate.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Alternative 1</th>
<th>Alternative 2</th>
<th>Alternative 3</th>
<th>Alternative 4</th>
<th>Alternative 5</th>
<th>Alternative 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Impact/Sustainability</td>
<td>High</td>
<td>Low</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>Medium</td>
</tr>
<tr>
<td>Public Perception</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Risk</td>
<td>Medium</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
<td>Medium</td>
</tr>
<tr>
<td>Reliability/Diversification</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
<td>Medium</td>
</tr>
<tr>
<td>Integration with SCRWRF Facilities</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>Low</td>
<td>Medium</td>
</tr>
</tbody>
</table>

High = positive in this category in comparison with other alternatives. 
High = neutral in this category in comparison with other alternatives. 
Low = negative in this category in comparison with other alternatives. 
For the “Risk” category, “High” means positive or low risk compared to other alternatives, and “Low” means negative or high-risk compared to other alternatives.
**Biosolids Program Diversification**

The final alternatives presented above are not mutually exclusive. It is recommended that the County’s biosolids management program have at minimum an emergency backup option in the event that the primary management alternative becomes no longer available periodically or at some time in the future. Some alternatives could be used in combination to diversify the County’s biosolids management program. Table 22 presents options for combining two or more of the final six alternatives to diversify the County’s program.

Alternative 6 (dried pellet production) does not work well when combined with another option because of the high capital investment required for a thermal drying facility, which is most efficient when operated constantly. However, dried pellet production is optimized when an agricultural fertilization program serves as a backup due to the reduced process equipment redundancy required and correspondingly lower capital costs.

Composting (alternative 5) could serve as a primary or secondary biosolids management alternative. Implementation of a composting facility or contract would be different depending on the portion of biosolids that would be composted. If agricultural fertilization/land application is the primary means of management, a contract or small composting operation at the SCRWRF would be more attractive than the County constructing a separate composting facility.

Applying biosolids to agricultural land only in the event of an emergency makes the biosolids less desirable to farmers and thus more difficult to market. Infrequent and unpredictable applications mean that a large inventory of permitted land application sites may be required to ensure that biosolids can be applied in a timely manner in an emergency.
Table 22. Diversification Options for Spokane County Biosolids Management Program.

<table>
<thead>
<tr>
<th>Primary Management Alternative (75 percent or more)</th>
<th>Secondary Management Alternative (25 percent or less)</th>
<th>Emergency Backup Management Alternative</th>
<th>Diversification Option Advantages</th>
<th>Diversification Option Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural Fertilization.</td>
<td>None</td>
<td>Landfill Disposal.</td>
<td>Cost-effective and attractive to participants because of regular fertilization.</td>
<td>Farmers may not be attracted to infrequent and irregular applications.  Application equipment is different for alternatives.</td>
</tr>
<tr>
<td>Reclamation/ Restoration or Landfill Cover Amendment.</td>
<td>Landfill Cover Amendment or Reclamation/ Restoration.</td>
<td>Landfill Disposal.</td>
<td>Multiple outlets for biosolids; Similar synthetic soil product required for both alternatives.</td>
<td>Farmers may not be attracted to infrequent and irregular applications.</td>
</tr>
<tr>
<td>Composting.</td>
<td>Agricultural Fertilization.</td>
<td>Landfill Disposal.</td>
<td>Multiple outlets for biosolids.</td>
<td>Farmers may not be attracted to infrequent and irregular applications.</td>
</tr>
<tr>
<td>Dried Pellet Production.</td>
<td>None</td>
<td>Agricultural Fertilization/ Landfill Disposal.</td>
<td>Having backup options allows thermal drying facility to eliminate redundancy and reduce capital cost.</td>
<td>Farmers may not be attracted to infrequent and irregular application;  Secondary option does not optimize capital investment in thermal drying facility.</td>
</tr>
</tbody>
</table>
Public Involvement

In January 2001, a public meeting was held to discuss the draft *Wastewater Facilities Plan*. A questionnaire was distributed and responses were documented in a summary. A copy of this summary is in Appendix A – Summary of January 2001 Public Meeting. Generally, survey respondents supported land application of biosolids and composting. A significant number indicated that they would be willing to pay an additional 2 to 6 dollars per month to have Class A biosolids produced. Respondents were divided on the issue of biosolids management by a private contractor, by the County, or by a cooperative agreement with the City.

Over the course of developing this plan, stakeholders have been given the opportunity to provide input into the alternatives analysis. Consultant and County staff met with the Board of County Commissioners on December 6, 2007 to discuss biosolids management. The Board directed the Utilities Division to continue evaluating the final six alternatives and solicit comments from environmental groups and the general public.

The County and consultant staff met with the eastern regional office of Ecology on January 14, 2008 to discuss the draft biosolids management plan and Ecology’s review and permitting requirements. Comments are summarized in Appendix B.

The County invited the Center for Justice and the Lands Council to a meeting regarding the County’s draft biosolids management plan. Both groups agreed to a meeting on January 14, 2008. Only the Lands Council attended the meeting, and comments received from participants are summarized in the meeting notes in Appendix B.

A SEPA checklist for the biosolids management plan was issued on April 11, 2008 with a Determination of Non-Significance (DNS). The checklist and DNS are in Appendix C. A public meeting was then conducted on April 17, 2008 to discuss the County’s draft biosolids management plan. No written comments received from the attendees with the exception of a handout given by one of the attendees discussing topics not specific to the biosolids management plan. A meeting questionnaire was provided and the results are summarized in Appendix D.
Recommended Plan

Based on evaluation of the economic and non-economic criteria for the six final alternatives, agricultural fertilization (also known as land application) and composting are the recommended biosolids management alternatives. Agricultural land application will serve as the primary biosolids management option, and composting as the secondary option. These management options will allow the County to diversify biosolids management, minimize risk, and maintain a cost-effective program.

There is a strong agricultural sector in Spokane County and surrounding areas that will support an agriculture-based recycling program. There are many successful agriculture-based programs in eastern Washington, including the City of Spokane. The biosolids program will focus on areas south of the City of Spokane for its main customer base if implemented via a County-operated land application program. Other implementation options will continue to be evaluated including a partnership with the City of Spokane and a public-private partnership. Discussions with these entities will continue and a decision on the implementation method will ensue in the next few months.

The main crops that will be fertilized with biosolids are wheat, hay, and other grain crops. The price for canola oil has risen significantly in the last few months, making the economics of growing biofuel feedstock more favorable. As the County’s biosolids management program moves forward with implementation, crop economics will be considered as farms are selected and permitted.

Continued evaluation of the implementation of a composting facility is necessary. Since the SCRWRF will not begin to producing biosolids for several years, there is time to consider various implementation options discussed in previous sections. Several years will likely be needed to site and construct a new facility. Incentives for composting firms should be considered to make a public-private partnership more attractive to prospective companies.
Plan Implementation

Implementation will involve the following elements:

- An application for a Washington State General Permit Biosolids for Biosolids Management will be submitted in 2010.

- General and Site Specific Land Application Plans will be developed after analysis of land applications sites and discussions with end users.

- Land application equipment, including trucks, tractors, and spreaders will be procured as needed.
Glossary

ATAD: Autothermal Aerobic Digestion.

BUF: Beneficial Use Facility (contract biosolids processing facility permitted by the state of Washington).

Cake: biosolids that have been dewatered, generally having a solids concentration of 15 percent or more, and a corresponding moisture content of 85 percent or less.

CBFT3 process: Columbus Biosolids Flow-Through Thermophilic Treatment process, which includes two stage anaerobic digestion. The first stage is operated at thermophilic temperatures (131°F) and the second stage at mesophilic temperatures (95°F). Three batch holding tanks are located between the two stages of the digestion process and have a minimum detention time of 30 minutes to one hour. The three tanks are sequentially fed and are operated in a fill-hold-draw mode with one of the three tanks always in the hold mode. This process meets the EPA Class A criteria.


CPLR: Cumulative Pollutant Loading Rate.

EPA: Environmental Protection Agency.

EQ: Exceptional Quality (biosolids that meet both the PC and Class A criteria).

MGD: Million Gallons per Day

MPN: Most Probable Number (analytical measure for bacteria).


PC: Pollutant Concentration.

PEC: Pathogen Equivalency Committee (EPA committee).

PFRP: Process to Further Reduce Pathogens (for Class A biosolids).

PFU: plaque-forming unit (analytical measure for viruses).

PSRP: Process to Significantly Reduce Pathogens (for Class B biosolids).

SCRWRF: Spokane County Regional Water Reclamation Facility.

SEPA: State Environmental Policy Act.

TS: Total Solids.

VAR: Vector Attraction Reduction.

VS: Volatile Solids.
References


Greater Vancouver Regional District (GVRD) website, http://www.gvrd.bc.ca


Northwest Biosolids Management Association (NBMA) website, http://www.nwbiосoλs.org

Project Management Institute (PMI).

Spokane County *Wastewater Facilities Plan*, 2002.

Spokane County *Wastewater Facilities Plan Amendment*, 2003.

Spokane County *Wastewater Facilities Plan Amendment*, 2006.


Washington Department of Agriculture website, http://agr.wa.gov/
Appendix A – Summary of January 2001 Public Meeting
Summary of Public Comments
from Wastewater Facilities Planning
January 2001 Public Meetings

Question and Answer Session – Large Group

• Q: What is the status of the County’s Comprehensive Plan?
  A: December hearings were cancelled pending review of several issues, including whether the
  proposed schedule for sewer extensions meets Growth Management Act requirements. The
  County is exploring options for accelerating the sewer extension program.

• Q: Will the County be addressing non-point sources of water pollution in the Facility Plan?
  A: It is true that up to 70% of water pollution in the County comes from so-called “non-point”
  sources, such as runoff from streets and agricultural areas. These are being addressed through
  other programs; the Wastewater Facility Plan addresses point sources only, i.e., sources that
  flow through the County’s piped sewer system.

• Q: Isn’t there a December 2001 deadline for addressing stormwater according to NPDES
  requirements?
  A: There is an effort underway to model the levels of dissolved oxygen (DO) in the Spokane
  River that partially addresses this issue. Waste load allocations for point sources vs. non-point
  sources may be established for the river by means of what is known as a TMDL process (“total
  maximum daily loads”).

• Q: What is the status of the septic tank conversion program?
  A: The sewer extension program was discussed at the public meetings via staff presentations
  and maps of the system. It is an important element of the County’s efforts to protect the quality
  of our aquifer, which provides our drinking water. The County Commissioners are currently
  considering limited exceptions to the mandatory hook-up program within the Urban Growth
  Area Boundary. These possible exceptions would only be allowed in cases where hook-up
  costs would present a hardship and where ultimate hook-up to the County sewer system is
  scheduled to occur within six (?) years.

• Q: Is there evidence that septic tanks have any effect on the aquifer?
  A: Yes. Comparing groundwater quality data from before and after septic tanks have been
  eliminated provides evidence that the program protects the quality of the aquifer.

• Q: What is the County’s role in eliminating CSOs?
  A: Some of the older areas in the City of Spokane have combined sewers, which carry both
  stormwater and wastewater. These combined sewers sometimes overflow during storms. These
  overflows, called combined sewer overflows or CSOs, are an issue for the City of Spokane,
  which is why the City has a CSO elimination program in place. The issue affects the County
  since the County sends wastewater to the City’s sewer pipes, upstream of the CSO overflow
  points, and then to the City’s regional wastewater plant.
Q: If the County sites a plant on the Little Spokane River, what level of treatment would be required?
A: Ultimately the treatment level for any new plant will be determined and approved by the state Department of Ecology. The wastewater at a new plant will be highly treated; the river would remain swimmable. A plant on the Little Spokane River would also have the potential advantage of augmenting low flows during the summer.

Q: Has the County identified a location for a new plant yet?
A: No, no specific locations for a new wastewater treatment plant have been identified at this point on either the Spokane River or Little Spokane River.

Q: What does a wastewater treatment plant look like?
A: The extent of aesthetics incorporated into the design of a treatment plant is up to the local community. A plant can be designed to be compatible with commercial, industrial, or neighborhoods with appropriate investments in property, design features, and consideration of aesthetic elements. Examples of treatment plant sites developed as parks and designed to blend with industrial settings were discussed.

Q: How is a new plant paid for? Will the decision be put to a vote?
A: The decisions on a preferred plan, and ultimately on plant location, will be made by the County Commissioners. There are various options for financing a new plant, but in general the ratepayers pay for the system as part of their monthly utility bill.

Q: Is it better to have one large treatment plant or several smaller ones?
A: Consolidating the region’s treatment processes in a large plant may offer some opportunities for cost savings, but the river may be able to accommodate the effluent discharges and meet water quality standards better if the system uses several smaller plants.

Meeting Questionnaire Responses (20 questionnaires returned, 10 of the 20 were mailed in after the meetings, all respondents did not answer all of the questions)

Demand Management Questions - Fact Sheet #1

1. Do you feel that public education efforts on water conservation are adequate? Rather than requiring more specific mandatory requirements to reduce water consumption and wastewater flows.

   Yes = 8  No = 9  Unsure = 2

Comments: For the majority of the population water is metered in order to provide lower cost potable water, to reduce costs individuals reduce consumption, mainly by implementing water conservation techniques; The public will not get involved until higher rates are proposed, they do not see any urgency and have chosen not to engage in the process; Water conservation only delays treatment needs; I believe education will be the biggest factor to convince Spokane County residents that this project is so beneficial to them; Public education inadequate on water use, should be used as much as possible to replace regulations; Spokane residents are not well informed on water conservation, they are spoiled and assume they need not worry, we need more laws and rules to preserve our environment; I feel you have made a good attempt to educate the people; No, people do not understand how large of an effect they can have by using water conservation; Public education and awareness programs should be increased and continued, in addition, incentives to conserve should be implemented, primarily through cost/usage ratio of consumption; Yes, better
education efforts and incentives are more acceptable alternatives; Unsure, I watch Channel 7 a lot and would probably watch informative presentations on water conservation rather than read about it in the newspaper, presently don’t have much information about it.

2. Do you think that low flow fixtures should be provided at no cost to individual homeowners for them to install at their own cost to replace traditional higher flow fixtures?

   Yes = 6       No = 12       Unsure = 2

Comments: It will save in the long run; Huge burden! Every problem that may occur will be your fault; They should be made available for individual homeowners who request them, they should not be distributed to all homeowners as many will not use them and there is not way to enforce their use; Perhaps low or shared cost would be more appropriate; Yes, but with some options to decline the offer; They should understand that they save money when they use less water (add a brick); No, providing fixtures does not install them, this would only waste money that would cost all taxpayers; These kinds of programs are received favorably by the public, similar to the something for nothing approach, grant funds should be sought to fund such a program; No, retrofitting homes with low flow fixtures should be accomplished at the homeowner’s expense, lower water and sewer bills should be incentive enough; Unsure, it would be nice to help low income people with the transition; No, individuals should take responsibility to do their part to help conserve water, most people could afford to do this on their own.

3. Should the County expand efforts to strictly enforce disconnection of basement sump pumps from the sewer system?

   Yes = 7       No = 9       Unsure = 2

Comments: A majority of the sump pump issues deal with businesses located within a shallow non potable aquifer, this aquifer becomes contaminated easily, therefor treating potentially contaminated water is a good practice to keep contamination from entering the potable aquifer; No, how would the County enforce?; Yes, only if there is a viable place to pump waterhouses should be built in places where sump pumps are not needed!; Where groundwater problems exist how are homeowners to protect their property; Educate; Does this mean that a basement could not have a bathroom or does this only apply to drain water; The County must develop an infrastructure to convey such wastewater and develop ordinances that would put “teeth” into failure to comply; No, this would be a waste of effort in our area, the ground drains so well that very few basements even have sump pumps; Unsure, is that a real problem; Unsure, what kind of sump pumps, do they pump to septic tanks?; No, I don’t see this an a problem since flooded basements are such a rare occurrence in this area.

4. Do you feel sewer rate surcharges on industries and businesses that contribute high-strength wastewater are appropriate?

   Yes = 18      No = 0       Unsure = 1

Comments: Only if additional treatment techniques are required to treat the high strength wastewater; Yes, proportionate to their use; Absolutely, if it was more expensive they would be pro-active in reducing high strength wastewater; Concept should be that user paysThe general public should not be responsible to subsidize the cost of treating industries high strength wastewater; Yes, the industries and businesses that produce the high-strength waste should pay the full cost of treatment; Yes, or they should take measures to reduce their high strength wastewater.
5. How do you think the County could best increase water recycling and reuse at industry and commercial enterprises?

Comments: Education; Could credit for recycling and reuse; By raising sewage treatment rate; Not sure; Make it available and decrease rates if reuse is implemented; Tax incentive breaks if they install facilities that recycle water for coolers and heaters; Provide information and resources for assistance; Pro-active actions to prevent contamination, enforcement, control nonpoint source pollution; new laws to restrict pollution; set examples of good pollution prevention practices; In view of the idiots who are going to require minimum flow in rivers we should dump all the water in the river that we can; It needs to be required prior to water hook-up to get done; Permit limitations on the strength and contaminant levels of industrial and commercial wastewater; Through development of regulations and ordinances and the ability to levy fines and penalties for failure of industry to recycle and reuse on site (incentive programs are great but the best disincentive is the financial threat); Through pre-treatment programs and education particularly if a cost-benefit is achievable; Unsure; Provide incentives to make them reuse their water; By charging or increase charges to compensate.

6. Additional comments and/or suggestions on Wastewater Demand Management (attach additional page if needed):

Comments: Face up to the problem of “not in my backyard” by disclosing sites for waste water facilities early in the planning stage.

Effluent End Use Questions- Fact Sheet #2

1. Which of the proposed alternatives do you prefer and/or support? Check all that apply.

- Surface Discharge and Streamflow Augmentation = 10
- Irrigation of Urban Greenspaces = 15
- Irrigation of Agricultural Land = 10
- Industrial Reuse = 13
- Wetlands Creation or Enhancement = 12
- Groundwater Recharge = 5

Comments: Good investment for future use of farmlands; Surface discharge, irrigation of urban green spaces, and wetlands creation are all good and should be used in combination depending on plant location; All of the above acceptable, don’t just talk about it, do it; Use all of the above unless uneconomical; I do not favor groundwater recharge as an alternative method of disposing of effluent; Wetlands creation/enhancement and groundwater recharge have too many unknowns for wide spread use over the aquifer.

2. Would you support irrigation of golf courses, parks and other green spaces with treated effluent if these properties were located over the aquifer?

   Yes = 15       No = 3       Unsure = 2

Comments: Yes, if it proved cost effective for both parties; Yes, it works and is being done all across the U.S., learn and educate; Yes, adequate controls and quality assurance is a requirement; Yes, evaporation and uptake by the plants could play an important role in reducing water use from the aquifer and disposing of the wastewater effluent; Yes, if they are not over the aquifer; Yes, al long as it would not negatively affect anything.
3. In terms of dollars per gallon, the cost of supplying treated effluent to agricultural lands will likely exceed the current market rate for agricultural irrigation water, which may be the upper limit that farmers would be willing to pay for the water. Should treated effluent be supplied to agricultural lands if Spokane County ratepayers must subsidize the cost of the supply?

   Yes = 6  No = 6  Unsure = 8

   Comments: The federal government is already subsidizing them with tax dollars; Must examine other reuse options and their associated costs, if other reuse options are significantly higher cost to ratepayers, I would support this option; Yes, it has to in a correct realm of cost; Yes, depending on a cost/benefit analysis, this is an expensive solution; Yes, I don't think this would be a problem as most true agricultural lands are located off the aquifer and do not have access to irrigation water, they are farmed as “dry land” and yields would significantly increase with irrigation; Unsure, depends on the cost analysis of the alternatives; Unsure, like to see analysis.

4. If the opportunity were available and affordable, should the County supply treated effluent for industrial reuse?

   Yes = 20  No = 0  Unsure = 0

   Comments: All options should be examined and implemented as appropriate.

5. Do you support use of wastewater effluent to create wetlands over the aquifer?

   Yes = 13  No = 5  Unsure = 2

   Comments: How far from production wells (drinking water)?; Bacteria degradation is high in surface waters; Only if existing wetlands could be used, not new ones being created; Yes, to the extent that quality is assured and potential runoff is monitored to assure there is no increase in pollution of streams and rivers; No, there are too many unknowns; No, would prefer this over a direct groundwater recharge.

6. Do you support the concept of groundwater recharge with highly treated effluent?

   Yes = 6  No = 10  Unsure = 4

   Comments: How far from production wells (drinking water)?; Yes, it is proven technology, thought is not pretty, but it is effective; Safety is my main concern; Only if other alternatives can’t be used; No, the Spokane area has had a sustained aquifer protection education awareness program for many years, citizens will not accept a solution as this that is contrary to the idea of aquifer protection; No, this aquifer does not lend itself to this type of activity; Not good.

7. Would you be willing to pay $5 to $10 more per month to implement effluent end use measures that increase beneficial reuse?

   Yes = 19  No = 3  Unsure = 2

   Comments: Yes, but not over the aquifer; Depending on the end use; Yes, depending on how beneficial the reuse will be, I would want to see substantial benefits ($5 to $10 is a substantial amount); Yes, Spokane County citizens have a history of supporting conservation and protection measures through self-taxation, it is my opinion that citizens would self-tax in order to fund a wastewater management program.

8. Additional comments and/or suggestions on Effluent End Use (attach additional page if needed):

   Comments: There is a benefit in reintroducing treated water into rivers, particularly in summer months; We need to help and encourage major users to be more active in water conservation, consider credits for water recycling, closed circuit water systems, electro coagulation systems, effective oil/water separators, prostrainers.
### Wastewater Treatment Plant Configuration Questions Fact Sheet #3

1. Which of the proposed alternatives do you prefer/support? Check all that apply.

   - **Alternative #1 - All Flow to Spokane Advanced Wastewater Treatment Plant (SAWTP)**
     - 2
   - **Alternative #2 - Combination of SAWTP, New In-City Plant, and New North Spokane Plant**
     - 2
   - **Alternative #3 - Combination of SAWTP, New Mid-Valley Plant, and New North Spokane Plant**
     - 14
   - **Alternative #4 - Combination of SAWTP, Multiple Mid-Valley Plants, and New North Spokane Plant**
     - 7
   - **Alternative #5 - No Action**
     - 1

   **Comments:** Could support #3 if drinking water impacts could be avoided (with river recharging aquifer this seems uncertain); Support #3, City is out of the loop, piping is not as extensive, spread out flow and discharge to provide for alternative measures; If the County plans to be urban in nature, with its population, should work to independently handle its sewage; Support Alternatives 3 and 4 without New North Spokane plant; More plants might make reuse options more viable; Not enough information yet to identify options to support; Support #3 if this is the most cost effective; Politics notwithstanding, existing resources should be maximized with the County building its own wastewater treatment plants; Try to avoid plants in the City of Spokane.

2. Do you think the County should work with the City of Spokane to establish a new interlocal agreement that will allow the County to send its wastewater to the City treatment plant, even though it will only satisfy the County's needs until 2020.

   - **Yes** = 9
   - **No** = 10
   - **Unsure** = 1

   **Comments:** Unproductive, costly, and avoiding the inevitable; Yes, this should be part of the solution, however, it should only be done as an interim solution and only as long as it is economically beneficial to the County; The agreement is necessary and required for all alternatives that increase flow to SAWTP over 10 mgd; Yes, as one of several different things to do at the same time; We should part from the City as soon as possible; Maximize existing resources.

3. Do you support the siting of a new treatment plant along the Little Spokane River to serve the North Spokane sewer service area and provide stream flow augmentation?

   - **Yes** = 12
   - **No** = 5
   - **Unsure** = 3

   **Comments:** Yes, but only with extensive working with residents and Friends of the Little Spokane River; Yes, substantial growth in north Spokane County warrants a localized siting; Unsure, try to avoid dumping in rivers; No, prefer not to put it back into river.

4. Do you think the County should try and enter into a new interlocal agreement with the City to build a new plant in the south-central part of the City to help resolve part of the Combined Sewer Overflow bottlenecks?

   - **Yes** = 5
   - **No** = 11
   - **Unsure** = 4

   **Comments:** No, City problem, County has no involvement; Should always explore regional solutions that would be most beneficial to all citizens of the County; Unsure, should be evaluated; This is a less desirable option, but should be included in a cost/benefit analysis when determining
feasibility; Yes, the County could even do more to resolve the CSO issue and help replace the sewer pipes and storm drains; No, like to stay independent of the City; No, keep the City out of it.

5. Do you think the County should build a new mid-Valley plant, that is owned and operated by the County, to handle all or part of the wastewater generated in the Spokane Valley?

    Yes = 16  
    No = 0  
    Unsure = 4

Comments: Unsure, should be evaluated; Yes, this is the best plan; Absolutely; Yes, County residents are going to have to pay for expanding the existing plant or building a new one, the SAWTP can only be expanded so much, establishing another plant MidValley should be done now.

6. Do you think multiple mid-Valley plants, owned and operated by the County, should be built if more of the treated effluent can be reused through irrigation and industrial operations?

    Yes = 10  
    No = 5  
    Unsure = 5

Comments: How far from wells?; Too costly and difficult to maintain; Unsure, should be evaluated; Yes, but question feasibility; Yes, if this is more cost effective; This is a big “if”, markets should be identified with long term commitments for reuse before this option is seriously considered; Unsure, this would only work if there truly are enough irrigation and industrial operations to make an impact on the total flow; Unsure, would like to see cost analysis.

7. Please score each of the following criteria to assist the planning team make decisions on wastewater treatment alternatives, with 5 being highly important and 1 being minimal importance.

    Overall cost: median = 4, average = 3.7
    Independence from the City of Spokane: median = 2, average = 2.8
    Regional solutions that benefit both City and County: median = 5, average = 4.1
    Minimizing number of treatment plants: median = 3, average = 3
    Recharging the Little Spokane River: median = 3, average = 2.6
    Maximizing effluent reuse: median = 4, average = 3.6
    Other

8. Additional comments and/or suggestions on Wastewater Treatment Plant Configuration.

    Comments: Who is really making decisions, County or City, and who has the final say; I would be most in favor of the plan which reuses as much water as possible; I feel we shouldn’t put effluent back into the river, even if we use it to irrigate during the summer and then put into river during winter.

**Biosolids Management Questions- Fact Sheet #4**

1. Which of the proposed alternatives do you prefer and/or support? Check all that apply.

   - Class B Treatment and Land Application = 10
   - Class A Treatment and Land Application = 11
   - Composting = 11
   - Treatment at City of Spokane Facility = 7
   - Co-Incineration with Solid Waste = 2
   - Privatized Management = 2

   Comments: Class B since it is proven and beneficial to all parties; I have no problem with Class B use, but the public most likely won’t buy into it; Not enough information yet; Unsure on privatized management, complications of government/contractor arrangement is not the best solution; Need to turn it into bio-energy for power; Bio-power plant for electricity.
2. Would you be willing to pay an additional $2 to $6 per month in sewer fees to have Class A biosolids produced?

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<th>Yes</th>
<th>No</th>
<th>Unsure</th>
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<tbody>
<tr>
<td>9</td>
<td>7</td>
<td>4</td>
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</table>

Comments: Yes, reuse opportunity is increased by higher quality biosolids; Yes particularly if it means continued land application.

3. Do you have any preferences about land applications sites?

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<th>Yes</th>
<th>No</th>
<th>Unsure</th>
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<td>7</td>
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Comments: Preferably farm land; Areas where children will not be playing; No, all options for reuse should be examined, quality of the biosolids produced is key; Yes, I think the agricultural lands west of Spokane are ideal; Yes, not over the aquifer; Yes, prefer that it is not over the aquifer; Yes, but not over aquifer; Yes, I would like to know the proposals and able to vote or have some kind of input in the decision making.

4. Would you be interested in using composted biosolids in home gardening projects?

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<th>Yes</th>
<th>No</th>
<th>Unsure</th>
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<tr>
<td>9</td>
<td>10</td>
<td>1</td>
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Comments: No, many composts available for less money; Yes, however, I don’t see this as a viable option, I don’t believe the demand is high enough locally; No, we already have animal fertilizer from our animals.

5. What are your views on incinerating the biosolids?

Comments: Don’t want it in the air; Not in favor; Not in favor due air emissions and energy prices; As long as air quality standards are still able to be met; Seems expensive with limited returns; Air quality must not be degraded; Can current plant handle the expected influx of solids or would additional capacity at the incinerator be needed? Clean air versus clean water? A toss up, both vital; Waste of resources; Why incinerate a viable product; No; Only if it compares economically with other measures; Incinerating biosolids is not the best use of the resource, although it may be the cheapest; It is a waste of energy and causes more problems with air quality than it is worth; Can it be an energy plant, what kinds of air pollutants and smells are created; Would it create energy?; I like this idea, but haven’t read enough on it; They shouldn’t be incinerated, they should be recycled.

6. Do you have any preferences as to whether the County, the City, or a private contractor manages biosolids?

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<th>Yes</th>
<th>No</th>
<th>Unsure</th>
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</thead>
<tbody>
<tr>
<td>11</td>
<td>6</td>
<td>3</td>
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Comments: I want the County to manage it if it is in the County; Use private contractor that is more responsible for their actions; Yes, County or City; Concerns about private contractors and their reliability; Seems whatever approach used for building plants will determine how biosolids will be dealt with from the County; No, should be regional; Why not form a City/County co-op and work and invest as a team; Private enterprises in many cases operates much more efficiently than government; More information is needed in order to make an informed opinion; Unsurprisingly probably; Yes, private contractor as long as they know what they are doing; Yes, private should help on costs; Yes, the County.

7. Additional comments and/or suggestions on Biosolids Management (attach additional page if needed):

Comments: No comments offered.
2000 Comprehensive Wastewater Management Plan Questions Fact Sheet #5

1. Do you think that the County should accelerate the Septic Tank Elimination Program from the current completion date of 2012 to a completion date of 2008?

   Yes = 9  
   No = 9  
   Unsure = 2

Comments: No, the citizens are not demanding it and they complain about traffic problems due to construction; Also curb any new developments without sewer or their own sewer system; No, I do not think that septic tanks are harmful, I do not know of any real science that shows that they are; No, diminishing returns will negatively affect ability to fully fund an accelerated construction program; No, I think there is currently too much disruption of traffic and increasing the size of projects rather than having more projects would be more efficient; No, should think about traffic issues; No, I need all the additional time I can get to save up the money to pay for this.

2. Do you believe the County should provide “up front” financing for the construction of sewers outside of the Septic Tank Elimination Program area, and within the Urban Growth Area Boundary, with reimbursements from future developments and associated new connections? If yes, do you think the County should construct only the major trunks?

   Yes = 9  
   No = 10  
   Unsure = 1

Comments: Yes, need them done right; Only major trunks; Put them in as needed, wait for anti growth attitude to change; Yes, major trunks; Unsure, need data on costs and impacts to comment; Only major trunks; Yes, the County should construct major trunks only with developers being responsible for side sewers and connections; No, use LIDs, latecomers agreements and pay for over sizing of lines (let growth pay for growth).

3. Should the County use sales tax and other local revenue to subsidize/fund construction of sewers outside of the Septic Tank Elimination Program area, primarily for new development?

   Yes = 4  
   No = 14  
   Unsure = 2

Comments: Unsure, if the funding can be readily offset then yes, if speculative and a slow rush investment then no.

4. Should new development pay the full cost for sewers and wastewater treatment?

   Yes = 14  
   No = 5  
   Unsure = 1

Comments: Yes, but they should not be allowed to put it in themselves; No, only to the main trunks; No, but a significant share; Yes, if Meadow Wood did it in Liberty Lake why can't others; Yes, except for the trunks which the County should install.

5. The Aquifer Protection Area Fee was established by the voters of this area in 1985 and has been instrumental in lowering sewer construction costs to customers. It will “sunset” in 2006 and will require another vote to reauthorize its existence. Do you support the reauthorization of this fee?

   Yes = 18  
   No = 1  
   Unsure = 1

Comments: Only if potential aquifer degradation is proven; If used for this and other purposes that benefit the aquifer; Yes, increase fee somewhat; Should only be used for what it was intended; An awareness campaign must precede the election to assure good turnout and a favorable vote; Yes, at the same fee.
Meeting Evaluation Questions

1. Overall, how would you rate the meeting format, presentation, and opportunities to provide comments?
   
   Good = 11    Fair = 4    Poor = 0

   Comments:  It was rushed through the presentation and did not allow time for comments during the presentation; A lot of material was covered in a short time.

2. How did you learn about this meeting? Please check all that apply:
   
   Notice in Update newsletter = 8    Neighborhood Council = 1    Article in association newsletter = 1    Ad in Spokesman-Review = 5    Notice faxed to business = 3    From a friend = 3    Media = 1    County Web Page = 0    Organization Meeting = 1

   How do you prefer to learn about public meetings:  Update newsletter (5); Mail (2); Email notice (2); Letter to resident (1); Newspaper Ads (1); Newspaper(1)

3. Please share any other ideas and input that will help Spokane County’s Wastewater Facilities Planning effort.

   Comments:  The newsletter is great; I would like to have a stakeholder interview and receive newsletters at my residence (Gary Dinwoodie); We need to show the neighborhood impacts by showing facilities in cities with similar economic conditions and not describe (pie in the sky) facilities in large California cities.
Appendix B – Minutes from January 14, 2008 Meetings with Department of Ecology and Lands Council.
Subject: Draft Biosolids Management Plan

Client: Spokane County

Project: SCRWRF DBO

Meeting Date: January 14, 2008

Meeting Location: Washington Department of Ecology

Notes by: Greg Moen, Dave Clark

Attendees:

Bruce Rawls (Spokane County), Dave Moss (Spokane County), Dave Clark (HDR), Greg Moen (HDR), Mark Fuchs (Ecology), Mike Hibbler (Ecology), Marni Solheim (Ecology)

Topics Discussed:

Draft Biosolids Management Plan

A PowerPoint presentation on the draft biosolids management plan and the final alternatives was given.

The Ephrata landfill in Grant County was mentioned as needing landfill cover material due to poor soils nearby. This landfill is currently undergoing closure activities which are expected to be completed by 2009.

Ecology mentioned that Governor Gregoire’s climate change initiatives may provide grants and incentives for non-traditional fertilizers. There is ongoing research at WSU.

Ecology stated that the review of the County’s biosolids management plan would take approximately 30 to 45 days, and would an informal review until a land application plan was submitted. The local health jurisdiction will also review the document. The general permit for biosolids management is on a five-year cycle.

Action/Notes:

HDR to follow up on Ephrata landfill and continue biosolids management plan development.
### Meeting Notes

**Subject:** Draft Biosolids Management Plan  

**Client:** Spokane County

**Project:** SCRWRF DBO  

**Project No:** 50980

**Meeting Date:** January 14, 2008  

**Meeting Location:** Spokane County offices

**Notes by:** Greg Moen

#### Attendees:

Bruce Rawls (Spokane County), Dave Moss (Spokane County), Dave Clark (HDR), Greg Moen (HDR), Brian Walker (Lands Council)

Not attending: Bonnie Beaver (Center for Justice/Sierra Club), Rick Eichstadt (Center for Justice/Sierra Club)

#### Topics Discussed:

**Draft Biosolids Management Plan**

A PowerPoint presentation was given on the draft biosolids management plan and the final alternatives. The ongoing project replacing contaminated lawns was mentioned as a possible outlet for biosolids. This project is being performed by the Idaho Department of Environmental Quality. Biosolids would have to be Class A/EQ for this project.

Ongoing research at WSU on composting manure and food waste was mentioned as a possible partnership opportunity. WSU has operated this facility successfully for a few years.

Lands Council had no objections to the draft biosolids management plan and the final alternatives and expressed continued interest in the County’s biosolids planning process.

#### Action/Notes:

HDR to send an Adobe pdf file of the presentation slides to Lands Council (done January 15, 2008).
Appendix C – SEPA Checklist
DETERMINATION OF NON-SIGNIFICANCE
WAC 197-11-970 & Spokane County Code 11.10.230(c)

*****************************************************************************

PROPOSAL: Spokane County Draft Biosolids Management Plan, April 2008

DESCRIPTION OF PROPOSAL: The proposed Project is a Biosolids Management Plan to be implemented in conjunction with the Spokane County Regional Water Reclamation Facility. Spokane County has evaluated numerous alternatives for biosolids management and is recommending land application and composting as their preferred alternatives.

The Draft Biosolids Management Plan report and the Environmental Checklist are available for review on the Spokane County Website: www.spokanecounty.org/utilities/

APPLICANT: Spokane County Public Works Department
Attn: Bruce Rawls, Division of Utilities
1026 West Broadway Avenue
Spokane, WA 99260-0430
(509) 477-3604
brawls@spokanecounty.org

LOCATION OF PROPOSAL: The Biosolids Management Program for Spokane County will occur within Spokane County, and specific land application sites will be determined and permitted at a later time.

LEAD AGENCY: Spokane County, Public Works Department, Division of Utilities

DETERMINATION: The lead agency for this proposal has determined that it does not have a significant adverse impact on the environment. An Environmental Impact Statement (EIS) is not required under RCW 43.21C.030(2)(c). This decision was made after review of a completed environmental checklist and other information on file with the lead agency. This information is available to the public on request.

This DNS is issued under 197-11-340(2). The lead agency will not act on this proposal for 14 days from the date below. Comments must be submitted by 5:00 PM, April 25, 2008.

*****************************************************************************
RESPONSIBLE OFFICIAL: N. Bruce Rawls, P.E., Division of Utilities Director
Spokane County Public Works Department
1026 West Broadway Avenue
Spokane, WA 99260-0430
(509) 477-3604

DATE ISSUED: April 11, 2008 SIGNATURE: N. Bruce Rawls

You may appeal this determination within 14 calendar days after it becomes final, commencing April 11, 2008 to the Spokane County, Division of Utilities, Attn: R. LaSalle, 1026 W. Broadway Ave, Spokane, WA 99260-0430 or rlasalle@spokanecounty.org. The appeal must be submitted in writing, by 5:00 PM, April 25, 2008, and contain the specific factual objections.

Contact Roxane LaSalle at Spokane County, Division of Utilities, (509) 477-7283, to read or ask about the procedures for SEPA appeals.
A copy of this DNS was mailed to:

1. U.S. Army Corp of Engineers (Eastern WA Office)
2. U.S. Department of Agriculture, NRCS
3. Department of the Army (Seattle District Corp)
4. WA State Department of Ecology (Olympia and Spokane)
5. WA State Department of Fish and Wildlife
6. WA State Department of Natural Resources (Colville)
7. WA State Department of Health (Spokane)
8. WA State Department of Transportation (Spokane)
9. Spokane Regional Clean Air
10. Spokane County Health District
11. Spokane County Building and Planning Division
12. Spokane County Engineering and Roads Division
13. Spokane County Housing & Community Development
14. Avista Utilities (Electric & Gas Services)
15. Chevron Pipeline Company
16. Yellowstone Pipeline Company
17. Qwest
18. Comcast
19. Spokane Transit Authority
20. Waste Management, Inc.
21. City of Airway Heights
22. City of Spokane
23. City of Spokane Valley
24. City of Liberty Lake
25. Liberty Lake Sewer & Water District
26. Town of Millwood
27. Spokane Tribe of Indians
28. HDR Engineering, Inc.
29. Valley Library
30. North Spokane County Library
31. Main City Library
Environmental Checklist

A. BACKGROUND

1. Name of proposed project, if applicable:
Spokane County Regional Water Reclamation Facility – Biosolids Management Program

2. Name of applicant:
Spokane County Public Works Department, Division of Utilities

3. Address and phone number of applicant and contact person:
Spokane County Public Works Department
1026 West Broadway Avenue
Spokane, WA 99260-0430
(509) 477-3604
Contact: Bruce Rawls, Utilities Director

4. Date checklist prepared:
March 21, 2008

5. Agency requesting checklist:
Spokane County Public Works Department, Division of Utilities

6. Proposed timing or schedule (including phasing, if applicable):
The new Spokane County Regional Water Reclamation Facility (SCRWRF) is scheduled to begin operations and begin producing biosolids in 2012. No biosolids will be generated until the SCRWRF begins operation.

7. a. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.

This checklist is prepared in anticipation of building a new regional water reclamation facility. The County will submit a permit application to the State of Washington Department of Ecology for coverage under the state biosolids management program prior to beginning operations. Specific land application sites will be identified at that time, or at later dates in accordance with a general land application plan submitted with the County's biosolids permit application. The County has identified some potential compost facilities in its biosolids management plan, and may propose to use one or more of those facilities in its permit application, or may propose to site its own compost facility. The permit process is subject to public notice and review.

b. Do you own or have options on land nearby or adjacent to this proposal? If yes, explain.

The new SCRWRF will be located at the old stockyards site. The site is bounded by Burlington Northern railroad tracks on the south, North Freya Street on the west, and adjacent industrial properties on the north and east. Biosolids land application and/or composting will take place at other locations away from the new water reclamation facility.
8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.

- Final EIS (February 2002), Final Supplemental EIS (December 2002) and Addendum to Final EIS and Final SEIS (December 2006) for Spokane County Wastewater Facilities Planning documents. All related environmental information and related studies are posted on the Utilities Division Website www.spokanecounty.org/utilities/

9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain.

The SCRWRF is subject to a complex permitting process. This checklist contemplates management of the biosolids produced by the SCRWRF at land application sites which are not specifically identified at this time, and/or at new or existing composting facilities. It is not known if other approvals or proposals might affect biosolids management decisions made by the County. State biosolids program rules require the County to comply with all other applicable federal, state, and local rules. If there are any related approvals or proposals which require attention or resolution they will be resolved at the time individual land application sites are identified.

10. List any government approvals or permits that will be needed for your proposal, if known.


If the County proposes to site a new composting facility, that facility will be subject to a separate local approval process and would also come under the state biosolids permit program.

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page.

This SEPA checklist has been prepared to evaluate two biosolids management alternatives identified in the Draft Biosolids Management Plan (April 2008) prepared for the County by HDR Engineering, Inc.

Biosolids will be generated by a yet to be constructed water reclamation facility which will be owned and permitted by Spokane County. Spokane County Utilities provides wastewater management for residential, commercial and industrial customers in the Spokane Valley and North Spokane service areas. Wastewater treatment is currently facilitated through a contract with the City of Spokane. County wastewater is treated at the Riverside Park Water Reclamation Facility operated by the City of Spokane. Due to limited capacity at the Riverside Park facility, coupled with increases in population and service area and a continued effort to reduce the number of residences served by septic systems, Spokane County Utilities expects a significant increase in demand for wastewater treatment over the next 25 years. In order to meet increasing demand for services, the utility will be constructing a new regional water reclamation facility.

Water reclamation produces an effluent product which can be discharged back to surface or ground waters, or in some cases reused for irrigation and other purposes. A second product of the water reclamation process is sewage sludge. The County has identified land application of biosolids and composting as preferred management methods.

Water reclamation generates large amounts of microorganisms which help clean the water. Those organisms must also be removed before the final effluent product is discharged. Those microorganisms along with solids removed early in the treatment process will be treated in an anaerobic digester system. The digester is essentially a vessel for liquid composting. The digestion process is designed to stabilize the solids (vector attraction reduction) and provide pathogen reduction (Class B pathogen reduction).
Once treated to meet the applicable regulatory requirements, the product is referred to as biosolids. This is an important distinction because biosolids are suitable for beneficial end uses. Biosolids are used as a soil amendment and as a substitute for commercial fertilizer products to grow a wide variety of crops. Under state law (Chapter 70.95J RCW), biosolids are considered a valuable commodity and the state is directed to maximize beneficial use of biosolids. The most prevalent method of biosolids management in the United States, and in Washington State is land application. The State of Washington Department of Ecology will not support disposal (non-beneficial use) of biosolids as a long term management solution.

The County is not limited in its choice of land application sites, and may develop its own sites or contract with an existing facility. Land application sites will be identified at a later date and are subject to a separate review process.

The County is considering composting at an existing off site facility, or at a future new composting facility. Composting is not a management method, per se, but is an additional step in the treatment process. Composting produces biosolids which meet exceptional quality standards for biosolids. Those standards include Class A pathogen reduction, vector attraction reduction (stabilization), and low pollutant concentrations. The goal of composting is a product suitable for marketing and distribution without further limitations on final use, whereas land application of the digested biosolids product requires site specific plans and approvals under the state biosolids management program.

This SEPA checklist has been prepared to evaluate possible impacts from the preferred alternatives. Specifically the County is proposing to develop a program for application of Class B biosolids to agricultural land, and/or composting of biosolids to meet exceptional quality standards, followed by marketing and distribution of the finished product.

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.

Pending public input and further review by local and state officials, actual land application sites have not yet been identified. The State Department of Ecology provides guidelines (WDOE 93-80, Biosolids Management Guidelines) to help managers identify and evaluate potential land application sites. Technical support is available from state regulatory experts, consultants, universities and others. Public notice must be carried out when specific sites are identified. All sites must comply with state regulatory requirements for biosolids management practices, including application at approved agronomic rates and set backs to property lines, surface water, and other important features. The Department of Ecology may also impose addition or more stringent requirements under its permitting process to address any unique requirements of a generating facility or at a specific land application site.

If the County pursues composting, it will either use an existing facility operated by a second party, or construct its own compost facility at a remote site. A new composting facility would not be located at the SCRWRF site because of space requirements and potential generation of odors. Several private contractors have existing facilities to compost biosolids including Royal Organics in Vantage, Washington; Glacier Gold in Olney, Montana; and EKO Compost in Lewiston, Idaho. These or other facilities may be used by the County at a future date.

13. Does the proposed action lie within the Aquifer Sensitive Area (ASA)? The City of Spokane, Spokane Valley or Liberty Lake?

The SCRWRF will be located in the Critical Aquifer Recharge Area, but no biosolids will be placed onto the ground at that location. At the SCRWRF, Class B biosolids will always be contained within treatment structures, storage containers, and/or covered transport vehicles. The County will not propose to land
apply any Class B biosolids in High Susceptibility Areas of the Critical Aquifer Recharge Area within Spokane County. Federal and state biosolids program rules do not restrict these applications, although proper management is required. The County believes, however, that removing these areas from consideration will reduce citizen concerns and allow the County to focus on developing a good beneficial use program on land application sites outside of the high susceptibility areas.

Composting facilities require sealed surfaces and are designed to avoid impacts to ground (or surface water) and should not adversely impact the Critical Aquifer Recharge Area.

14. The following questions supplement Part A.

a. Critical Aquifer Recharge Area (CARA) / Aquifer Sensitive Area (ASA).

(1) Describe any systems, other than those designed for the disposal of sanitary waste installed for the purpose of discharging fluids below the ground surface (includes systems such as those for the disposal of stormwater or drainage from floor drains). Describe the type of system, the amount of material to be disposed of through the system and the types of material likely to be disposed of (including materials which may enter the system inadvertently through spills or as a result of firefighting activities).

Compost facilities do not dispose of any wastes below the ground surface. Composting takes place on a sealed surface (such as asphalt), and may occur under cover or in an enclosed building. Curing piles of the finished product prior to sale may be stored on the ground. Protection of surface water run on and run off are specifically addressed in the design and operation of compost facilities.

Biosolids land application sites are not systems as such, but they are active facilities. Land application sites are selected based on a variety of criteria including soils, proximity to sensitive areas, distance from the treatment works generating the biosolids, prospects for a good partnership with the land owner/site manager, and cost. Although there are many good sites for biosolids land application, there are few ideal sites. Typically sites are managed to mitigate any limitations of the particular site.

A typical biosolids land application site operates from a staging area where biosolids are delivered prior to being land applied. Biosolids are delivered by truck and typically remain in the staging area for no more than a few days before they are applied. Application equipment is often a tractor-towed manure spreader, although some individual vehicles are specifically designed for land application of biosolids and other residuals. Application of biosolids must be coordinated with crop management. For example, on hay crops biosolids are applied in the early spring, or shortly after a cutting. For summer fallow dryland wheat, applications can begin after harvest in late summer and can proceed up to fall planting in the following year. During winter months biosolids are stored in piles in areas approved as part of an overall permitting process. With the onset of warm weather, application of stored materials commences, and the operators once again work out of staging areas as new material is delivered to the site. Agronomic rates of application are determined based on anticipated crop need (per Cooperative Extension or other authoritative recommendation), analysis of biosolids nutrient content, and residual soil nitrogen. Consequently the land application operation must also be coordinated with soil and biosolids sampling. Application rates are approved by the State of Washington Department of Ecology. The entire biosolids operation falls under an over-arching permit, which requires analysis of biosolids for compliance with federal and state qualitative standards, as well as development and adherence to site specific land application plans.

(2) Will any chemicals (especially organic solvents or petroleum fuels) be stored in aboveground or underground storage tanks? If so, what types and quantities of material will be stored?

Biosolids will not be stored in aboveground or underground tanks. Land application of biosolids to agricultural land is a typical farming operation similar to application of manure. Growers may have fuels and other liquids stored on site as part of their normal farming operations. Typically, biosolids
are delivered to a staging area – an area of short term storage at a land application site – and from the staging area are loaded into vehicles appropriate for applying them to the land at a specified rate. In eastern Washington, application during winter months is generally not possible because of snow cover and frozen soils. During winter months biosolids are stored (piled) at land application sites. Winter storage locations are approved by the Department of Ecology as part of the permit review process. Consideration is given to proximity to surface waters or conveyances, slope and potential for runoff, and ease of access. The amount of biosolids stored on a site varies with the size of the site, the nutrient content of the biosolids, and the agronomic requirement of the crop, but is not allowed to exceed the capacity for land application at the site. In the spring after snow melt and when soils have stabilized and can accept equipment traffic, biosolids are removed from winter storage and applied to the land. A typical season of land application is April through November depending on overall weather and local variations in climate.

Composting can really be visualized in two phases. Active composting converts organic materials to the beneficial compost end product, and in the case of biosolids is designed to achieve the treatment necessary to allow marketing and distribution of the finished end product without the need for additional regulatory controls. Finished products are typically moved to a curing pile prior to actual sale. The volume stored depends on the amount of material received by the facility and local demands. Generally compost facilities face some limitation on storage due to the physical size of the operation, but this will vary with the specific facility.

(3) What protective measures will be taken to insure that leaks or spills of any chemicals stored or used on site will not be allowed to percolate to groundwater? This includes measures to keep chemicals out of disposal systems.

The U.S. EPA has evaluated the safety of biosolids land application through a comprehensive risk assessment process. The end result is that nine pollutants of concern are regulated for the land application of biosolids: arsenic, cadmium, copper, lead, mercury, molybdenum, nickel, selenium, and zinc. Because of improvements in manufacturing processes, wiser product selection by homeowners, and an effective industrial pretreatment program, biosolids in Washington state are typically far below the federal limits for pollutant thresholds and biosolids produced by Spokane County are expected to meet all applicable standards for pollutant limits. Biosolids are known to contain trace amounts of other chemicals. Concentrations are typically low and no standards of regulation are currently in place for trace pollutants although research and evaluation is ongoing. Biosolids are also regulated for pathogen reduction and vector attraction reduction. Biosolids are tested specifically for nitrogen content and are required to be applied to the land at an agronomic rate to protect against nitrate leaching to groundwater. Land application projects are further supplemented by soil sampling. Fall sampling can determine whether applied nitrogen exceeded the crops' demand. Fall and spring sampling can be used to help managers fine tune agronomic rates of application on sites. The County's biosolids management program is subject to regulation and comprehensive permitting under the state biosolids management program implemented by the State of Washington Department of Ecology.

There have been occasional instances of mismanaged biosolids programs which have attracted media attention from time to time. These situations are in some cases the result of poor management practices. The overwhelming experience with biosolids land application is that it has been safe and beneficial. There are many successful programs in Washington State, most of which rely on land application in an agricultural setting.

Compost facilities incorporate design elements to protect against run on of stormwater, or runoff of process wastewaters, and are typically carried out on a sealed surface. Finished products are usually moved to a curing pile prior to sale. Compost facilities are sited and permitted with the protection of water resources as a primary consideration.
(4) Will any chemicals be stored, handled or used on the site in a location where a spill or leak will drain to surface or groundwater or to a stormwater disposal system discharging to surface groundwater?

There are two types of storage activities at biosolids land application sites. *Staging* and *winter storage.*

Staging areas are typically close to access points and in a location convenient for equipment operations. No “spills” of biosolids are contemplated. Rather, management is orderly: biosolids are tipped from the transportation vehicle at the staging area and temporarily stockpiled, or loaded directly into the land application vehicle. Biosolids typically remain in a staging area for at most a few days before they are applied to the land. At the twenty percent solids level projected by the County, biosolids have the consistency of damp earth. Small amounts of liquid may be observed on tipping from the delivery vehicle, but free water is minimal and specific management controls for liquids are generally unnecessary (note, some programs do store or apply liquid biosolids, but this proposal is for a processed, dewatered biosolids product). Staging areas are restored after use.

Winter storage locations are required to be approved by the Department of Ecology as part of the permitting process. The agency will typically look for areas without a seasonal high water table, and where slopes are minimal so that runoff (and run on) is avoided. The agency is especially concerned with adjacent surface waters or potential conveyances. Berms around winter storage areas may be required in some cases, and some sites may not be suitable for winter storage at all. The amount of material stored on a site is not allowed to exceed the capacity of the site when the biosolids are applied at an agronomic rate.

Active composting typically takes place on a sealed surface, and surface water systems are isolated from process wastewaters which are collected on site or directed to a sanitary sewer. Compost curing piles (of the finished product) may be stored on the ground, on sealed surfaces, or in some cases under cover. Regardless, compost facilities are still required to protect against contamination of off site surface waters.

b. *Stormwater.*

(1) What are the depths on the site to groundwater and to bedrock (if known)?

As no specific sites for land application have been identified, the depth to groundwater is not known. Proximity of groundwater is a key criterion for evaluating a land application site and preparing a site specific land application plan. When preparing a site management plan, soil data from the Natural Resource Conservation Service is evaluated; data on typical depths to groundwater is available from that resource. A review of available data on wells located on site or within a quarter mile of the site is also conducted. The State Department of Ecology has an on line data base which is easily consulted for that purpose, and which can sometimes be supplemented local knowledge as well. The Department of Ecology requires biosolids managers to include a groundwater protection plan in their permit application package whenever the seasonal high level of groundwater will be within three feet of the surface on a site.

The depth to groundwater at the identified existing compost facilities is not known, but is not considered critical for this process as they are existing facilities. The depth to groundwater at any new compost facility is unknown at this time since no sites have specifically been identified. Depth to groundwater usually is not a critical concern for compost facilities unless the seasonal groundwater table is high enough to interfere with operations. In that case special steps would be required to protect the resource, but it is most likely a compost facility would not be sited in such a location to begin with.
(2) Will stormwater be discharged into the ground? If so, describe any potential impacts.

The land application of biosolids does not involve the collection or discharge of stormwater.

Some compost facilities are enclosed. Compost facilities constructed in the open must be designed to control run on and run off. Clean stormwater from compost facility areas and surrounds may be diverted to swales and an infiltration system. Leachate that may be produced in the composting process is kept separate from stormwater, and process waters are collected and reused or discharged to a treatment system.

B. ENVIRONMENTAL ELEMENTS

1. Earth

a. General description of the site (circle one): flat, rolling, hilly, steep slopes, mountainous, other.

Agricultural land application sites are typically flat to gently rolling, with some localized areas of steeper relief. Biosolids are only applied to areas where crops are planted.

Compost facilities require a level working area for composting, delivery of feedstocks, and removal of finished products.

b. What is the steepest slope on the site (approximate percent slope)?

Typical farming practices are generally limited to areas with a slope of 15% or less. Biosolids managers typically look for sites with flatter slopes, as it makes site management easier.

For compost facilities steepness of slope is not a factor as sites must generally be level.

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any prime farmland.

Soil types are unknown at this time. Evaluation of a land application site and preparation of a site specific land application plan requires a review of soil data available on line from the Natural Resource Conservation Service. Soils are evaluated against an ideal and management practices are adjusted if necessary.

Soil types at compost facilities are generally not relevant except for considerations relating to construction activities.

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.

This cannot be known without first identifying a specific site or sites. The sites where biosolids will be land applied will be under cultivation. It is reasonably expected that unstable soils will not be suitable for farming and will be avoided by the grower.

It is unlikely that a compost facility would be located on an area of unstable soils. This can only be evaluated when a specific site is proposed.

e. Describe the purpose, type, and approximate quantities of any filling or grading proposed. Indicate source of fill.

Biosolids are not used as a "fill," and in fact are applied sparingly. A typical rate of application is
around five dry tons per acre – about 10,000 pounds where the top 6 inches of soil weigh in nominally at about 2,000,000 pounds per acre. The rate of application varies with the need of the crop and the nutrient concentration of the biosolids. No grading is necessary for the land application of biosolids. Biosolids may be tilled into the soil after land application.

Construction of a compost facility can require filling and grading to achieve the generally level area required for composting and materials management. The amount of fill and extend of grading will depend on the initial character of the site.

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe.

Application of biosolids is generally expected to reduce erosion potential; certainly erosion potential will not increase as a result of this project. Generally, the addition of biosolids to soils is expected to increase organic matter content and improve plant health, thereby improving soil condition overall.

If a new compost facility is constructed, it is possible that erosion could occur prior to completion of the work. The potential for erosion during site construction is not considered high since construction would likely occur during dry months of the year.

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?

For biosolids land application, a small paved area is required at the land application site for storage of biosolids during winter periods. The impervious area will typically cover less than 0.5 % of the site, but will depend on the size of the land application site.

For composting, the amount of land covered with an impervious surface will depend on the size of the facility. At a minimum the active composting area is expected to be covered, and likely the access roads and parking area.

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:

Biosolids land application goes hand in hand with typical farming practices applicable to the particular site where they are being applied. Certain types of biosolids are required to be tilled in after application, while others do not require tillage. These questions are taken into consideration when developing the site specific land application plan.

Appropriate site management techniques are available to reduce erosion potential on sites during construction.

2. Air

a. What types of emissions to the air would result from the proposed (i.e., dust, automobile, odors, industrial wood smoke) during construction and when the project is completed? If any, generally describe and give approximate quantities if known.

Biosolids have an odor which depends in part on the wastewater treatment process from which they are derived, and how they are subsequently processed. Characterization of any odor is also a matter of subjective interpretation. Processed biosolids tend to have a musty, earthy organic smell, and some ammonia smell is common. A person may make some association with sewage, but biosolids generally do not have the same odor as sewage. The odor is most detectable when biosolids are tipped from a delivery vehicle and when they are applied to the land. Odors tend to be localized and dissipate fairly quickly after land application.

Biosolids are required to achieve a standard known as Vector Attraction Reduction (VAR). VAR is a standard of treatment or performance designed to reduce the attraction of vectors (insects for
example) to the biosolids, which may carry disease away from the site. Biosolids are also required to undergo a pathogen reduction processes or testing to further minimize the potential for disease. The biosolids management plan prepared for the SCRWRF specifies that biosolids produced by the County must be treated to meet VAR at the treatment facility. Both anaerobic digestion and composting will achieve the required standard. A secondary means of VAR is tillage following land application. Tillage is not required for biosolids which have first met VAR at a treatment facility, but it is an effective secondary means of odor control on land application sites when necessary. Tillage is generally an option available to land managers with seasonally cultivated crops, including summer fallow winter wheat. Tillage on dry soils can create dust, typical of dryland farm operations. Internal combustion engines powering transport tractors and farm equipment produce exhaust emissions.

Composting is a complex process. Biosolids by themselves do not compost well since they tend to be too moist and pack too densely. Consequently an adequate supply of oxygen cannot be maintained in the pile to support a proper aerobic composting process. For that reason biosolids are typically combined with other compostable feedstocks. Woodchips are commonly used as a feedstock, although in some areas of the state they are in short supply and prices are climbing. Biosolids can be composted with yard waste; woody fractions are typically chipped before addition. Occasionally recoverable bulking agents such as tire chips have been used. The various components of a compost facility give rise to different odors. Odor compounds potentially produced during composting include sulfides, organo-sulfides, and ammonia. The most potential for odors occurs when piles are initially mixed, and later if they are turned. Biosolids may be composted using turned pile systems as well as static aerated piles. The delivery of feedstocks to a compost facility can generate dust and odors when materials are tipped at the site. Additional dust can be generated from onsite handling including chipping or grinding prior to processing.

b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.

No.

c. Proposed measures to reduce or control emissions or other impacts to air, if any:

Biosolids are required to meet a standard for VAR – roughly equivalent to odor control, either in the treatment process itself or at the land application site. Spokane County proposes to meet VAR requirements through the treatment process. Incorporation in the soil at land application sites is known to control odors. Both approaches have been shown to be effective. The likely fairly remote nature of land application sites further decreases the potential for odor to become an issue.

Where odor is a concern, composting may occur in an enclosed building where blowers direct inside air through biofiltration systems. Biofiltration is known to be an effective means of odor control. Application of these features depends on the design of the facility and potential for odor impacts.

3. Water

a. Surface:

(1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into.

Since no specific sites are identified with this checklist, the proximity of surface water is unknown.

(2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans.

Biosolids land application seldom "requires" work within 200 feet of surface waters. The available
land base for biosolids land application in Washington State far exceeds the amount of biosolids produced. Managers generally try to avoid areas immediately adjacent to surface water bodies as additional regulatory requirements may come into play. State guidelines specify setbacks to surface waters, including intermittent surface waters which are the most common case on agricultural land application sites.

It is possible that a compost facility could be sited within 200 feet of surface waters, but as with land application sites, the selection process typically favors sites with fewer potential administrative hurdles and where environmental issues are easier to manage.

(3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.

None.

(4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.

A grower may have a surface water right, and may exercise that right in his/her daily farming operations, but biosolids land application itself does not require withdrawals or diversion of water resources.

It is unlikely that a compost facility would require a surface water right, although a source of water is necessary. The most likely source is a municipal supply or a well.

(5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.

It is possible that a land application site will be located within a 100-year flood plain. Application in flood plains is not prohibited under state or federal rules. Regulatory agencies and land managers, however, must take into account proximity to surface waters, any specific other regulations that come into play as a result, and the season of application. Winter time storage may be restricted or prohibited in a flood plain area.

Since the location of any proposed new compost facility is unknown, presence in a flood plain area is not known. It is likely the selection process would seek to avoid flood plain areas if a new compost facility is developed.

(6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.

Site specific land application plans are specifically written with the intent of avoiding this kind of impact. Regulatory personnel look closely at site topography and adjacent surface waters or conveyances. Biosolids land application sites are intentionally managed to protect adjacent surface water bodies from accidental overspray during application of biosolids and any contaminated runoff.

Compost facilities may generate leachate, but discharge to surface waters would not be allowed under state water quality laws.

b. Ground:

(1) Will groundwater be withdrawn, or will water be discharged to groundwater? Give general description, purpose, and approximate quantities if known.

A grower may have a groundwater right and biosolids may be applied to an irrigated crop, but neither groundwater withdrawal nor liquid discharge to groundwater are required for land application of
biosolids.

A compost facility requires a source of water. If a municipal supply is not available, the most likely source is a well. There would be no discharge of waste materials to groundwater.

(2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals; agricultural; etc.). Describe the general size of the system, the number of such systems, or the number of animals or humans the system(s) are expected to serve.

Biosolids were specifically removed from the definition of solid waste under state law in 1992, and are defined as a valuable commodity under state law. Biosolids are not “discharged” into the ground. Rather, biosolids are spread on the land by application equipment designed to achieve a rate of application consistent with predetermined crop nutrient needs. In some cases biosolids are tilled into the soil after land application. This tillage is a means of vector attraction reduction (previously discussed), but also preserves the ammonia content of the biosolids which is valuable part of the nitrogen component delivered by the biosolids.

Solids in a water reclamation process are derived from different sources. Generally, wastewater goes through a screening process at the headworks of the treatment facility. The material screened out is trash – cloth, plastics, etc. and will be disposed as solid waste. Grit – mostly sand and pebbles and other material with a high specific gravity - is removed by various methods, and will also be disposed of as a solid waste. The organic solids that become the biosolids after treatment are generated from two sources. Shortly after entering the treatment works, sewage may undergo a settling process. The primary solids accumulated in that process are periodically removed for further treatment. Large amounts of microorganisms are actually cultivated in the treatment of wastewater. Those microorganisms remove solids from the wastewater – the solids are their food source, but eventually the mass of microorganisms itself must be removed, and those solids also become part of the biosolids eventually. The untreated solids are then processed by various means to produce biosolids. At the SCRWRF, the process selected is anaerobic digestion. Anaerobic digestion is a proven technology widely used for stabilizing biosolids. The stabilized biosolids may be further treated by removing some of the water. The County will dewater its biosolids product to about 20% solids. At that solids concentration the biosolids have the consistency of moist earth. Dewatered solids are much less expensive to transport and are in some respects easier to manage in land application projects. The final biosolids product will be tested and is reasonably expected to meet standards for pollutant limits, and pathogen and vector attraction reduction. When standards are met, the residual solids – originally referred to as sewage sludge, can properly be called biosolids.

A compost facility would produce a product suitable for marketing and distribution to the general public. Unless some form of industrial on site wastewater disposal system is approved for the compost facility there should be no discharge of wastes to the ground from a composting activity.

c. Water Runoff (including storm water):

(1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe.

Biosolids are not a source of runoff and do not require collection or disposal measures after land application, although buffers are put in place on land application sites as a part of standard land application site design.

Compost facilities can have run off from either active composting piles or from curing piles (where finished product is stored). The design of any new compost facility is not known at this time, but process wastewaters are collected and handled separately from storm waters. It is possible during
drier times of the year that the compost process would have a moisture deficit, and no wastewater would be produced.

(2) Could waste materials enter ground or surface waters? If so, generally describe.

If over applied, liquid biosolids could runoff from a land application site. If over applied, excess nitrate from biosolids could leach beyond the rooting zone of the crop and eventually to groundwater.

If not properly managed, composting could lead to surface water impacts from process wastewater and contaminated stormwater runoff.

d. Proposed measures to reduce or control surface, ground, and runoff water impacts, if any:

Every land application site has a site specific land application plan. Intrinsic site factors including soils, topography, depth to groundwater and proximity of surface water are all considered when developing site plans, and the State Department of Ecology approves plans with those and other considerations in mind. Ecology has issued guidelines with recommended buffers to surface water, although those may be adjusted to suit the individual site circumstance. Biosolids are required to be applied at an agronomic rate. Biosolids nitrogen is analyzed, and residual soil nitrate determined from soil sampling is taken into consideration when approving application rates. Typically fertilizer guides produced by Cooperative Extension agencies are consulted to determine crop needs, although other authoritative sources may also be used. The County will also consider phosphorus in selecting land application sites and in determining application rates.

Compost facilities are intentionally designed and operated to avoid impacts to surface waters. Run on of excess surface water is controlled where necessary by diversion systems. Process wastewater (if any) is collected and discharged to a sanitary system or reused. No impacts to groundwater are contemplated from the composting activity.

4. Plants

a. Check or circle types of vegetation found on the site:

- deciduous tree: alder, maple, aspen, other (Domestic Landscaping)
- evergreen tree: fir, cedar, pine, other (Domestic Landscaping)
- shrubs (Domestic Landscaping)
- grass (Domestic Landscaping)
- pasture
- crop or grain, alfalfa, wheat
- wet soil plants: cattail, buttercup, bulrush, skunk cabbage, other
- water plants: water lily, eelgrass, milfoil, other
- other types of vegetation: Native grasses

Biosolids will be applied to agricultural lands, therefore a crop – grain, legume, hay, etc. will be on site. Other plants may be in the surroundings, but biosolids will be applied to the actively farmed area of the site.

The type of vegetation potentially present at a new compost facility is unknown at this time.

b. What kind and amount of vegetation will be removed or altered?

A crop is generally harvested from a land application site at some point, though it is always possible that the crop would not be harvested due to poor quality or market prices.

Construction of a new compost facility would require clearing and grading of the future work area. The kind of vegetation to be removed is not known, absent the selection of a site.
c. List threatened or endangered species known to be on or near the site.

None can be identified until specific sites are under consideration. Since land application is only contemplated here for agricultural lands, impacts to threatened or endangered species are not expected.

The presence of any threatened or endangered species on a proposed compost facility site would likely preclude construction at that location.

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:

The goal of biosolids in an agricultural setting is to improve soil tilth and plant growth and achieve targeted crop yields. Enhancement of vegetation on the site is not specifically a goal other than to improve crop yields through fertilization.

Compost facilities may use some of the product they manufacture to develop on site landscaping in order to improve site aesthetics, or reduce impacts from lights, dust or noise.

5. Animals

a. Circle any birds and animals which have been observed on or near the site or are known to be on or near the site:

Birds:
Mammals:
Fish:
Other:

Many animals may be on or near an agricultural site.

The kinds of animals near a proposed compost facility cannot be identified at this time since a site has not been identified.

b. List any threatened or endangered species known to be on or near the site.

None can be identified at this time.

c. Is the site part of a migration route? If so, explain.

This cannot be ascertained until sites are identified at a later date.

d. Proposed measures to preserve or enhance wildlife, if any?

The application of biosolids to agricultural sites is not generally intended for wildlife enhancement. Biosolids have been used to improve habitat on non-agricultural sites, but that is not proposed here. Land application of biosolids is typically carried out as a normal farming practice and incremental impacts to wildlife are expected to be minimal.

The construction of a new compost facility would not likely involve wildlife preservation or enhancement.
6. Energy and Natural Resources

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project’s energy needs? Describe whether it will be used for heating, manufacturing, etc.

No energy is required for a land application site. Typically, diesel-powered tractor trailer combinations are used to transport biosolids from the point of generation to the land application site. Farm equipment such as tractors towing spreaders or specialized application vehicles are used for land application. Typically these vehicles are diesel powered.

Compost facilities require electrical energy to power lights, blowers, motors and pumps in addition to fossil fuels to power equipment.

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.

No.

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any:

Typical biosolids contain from 2-4% solids by weight when they first exit the treatment process. They are very liquid and easily pumped or sprayed. Transportation of liquid biosolids is sometimes done when the application site is nearby, but transporting liquid greatly increases the number of truck trips and cost of a program, and of course increases the amount of fuel consumed for transportation. The County’s treatment facility will incorporate additional processing to dewater its biosolids to about 20% solids. One example operation in the state reduces truck trips from about 1,200 per year to less than 100 per year by dewatering its biosolids. The reduction in vehicle trips varies with the operation, but it is typically very significant.

It is not known what types of energy conservation features might be incorporated in a new compost facility, if constructed.

7. Environmental Health

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe.

Biosolids are regulated for pathogen reduction and pollutant concentrations under federal and state laws. U.S. EPA engaged in a comprehensive analysis of and risk assessment for biosolids prior to adopting nationwide rules in 1993. Nine pollutants of concern were identified and EPA established limits for those pollutants which it believes are protective of public health and the environment. Other pollutants are present in biosolids in very small amounts. The fate of these pollutants is not fully understood, and study continues. The overwhelming experience with biosolids nationwide is that they have proven highly beneficial when land application is responsibly managed. U.S. EPA continues to support land application, and the State Department of Ecology continues to support some form of beneficial use as the proper end management point (over any form of disposal). Proper treatment and management of biosolids remain as essential components for protecting human health and the environment.

The concentration of the aforementioned pollutants is expected to be reduced in compost simply because of the dilution factor realized by the addition of a bulking agent or other compost feedstocks. It is possible that the concentration of residual pesticides could increase slightly due to use by
homeowners and possible residual in yard waste, but this is not know with certainty, nor has it been established that yard waste would be a component of the feedstock.

(1) Describe special emergency services that might be required.

It is possible that an accident in transit would result in a spill of biosolids on the roadway. For this reason the State Department of Ecology requires transporters of biosolids to prepare a Spill Prevention and Response Plan. Aside from emergency vehicles that could be needed in any accident situation, a front-end loader and/or personnel with shovels would generally be sufficient to clean up any spilled material.

Compost facilities have caught fire at times, and emergency fire response may be needed. This is not a common problem.

(2) Proposed measures to reduce or control environmental health hazards, if any:

Biosolids are a highly regulated commodity. They are analyzed for pollutant concentrations, including pathogen reduction and must meet appropriate standards prior to land application. Individual land applications sites are managed according to a site specific land application plan which is required to consider critical site features as well as potential impacts to surrounding properties. Generators are required to report violations of permit conditions, and must submit an annual report each year.

Operators of vehicles transporting should carry a copy of the approved Spill Prevention and Response plan with them, and be familiar with procedures in case of an accident.

The tradeoff for compost over land application is in the manufacturing process. Biosolids compost is expected to be treated to Class A pathogen reduction and meet the highest federal/state standards for a material derived from biosolids before it leaves the compost facility. This is because there are no further restrictions on use once it is sold (or given away).

b. Noise

(1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, aircraft, other)?

Noise in the area will not affect this proposal.

(2) What types and levels of noise would be created by or associated with the project on a short-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site.

Biosolids will likely be delivered to the land application site by tractor trailer. Farm equipment including tractors and loaders will be used at the land application site itself. Biosolids operations may commence fairly early and continue into the evening, but biosolids are not applied at night. Generally, biosolids land application proceeds according to the grower's typical hours of operation. The amount of noise at the land application site will be consistent with noise levels created by the existing farm equipment and farming practices.

Noise will be generated at compost facilities from several sources, including trucks entering and leaving the facility. If woody material used in the composting requires chipping or grinding, noise will result from the operation of that equipment. Front end loaders and other mobile equipment on site, including conveyors will make noise when operating. Blowers may also make noise if they are used to aerate piles or to draw air from an enclosed facility through a biofilter. It is assumed that any new compost facility will operate during normal business hours.
(3) Proposed measures to reduce or control noise impacts, if any:

No specific measures are proposed at land application sites. Certain specialized mufflers that can significantly reduce exhaust noise are available for loaders and other on site equipment that may be employed at compost facilities. There may be other noise reduction methods available, but these cannot be described until a facility is actually proposed, and an operating plan is prepared.

8. Land and Shoreline Use

a. What is the current use of the site and adjacent properties?

Since no specific sites have been identified, zoning and land use information is not available at this time. An agricultural zoning classification is expected for land application sites, and a compost facility would likely be located in an industrial or light industrial area, or possibly in an agricultural area.

b. Has the site been used for agriculture? If so, describe.

It is possible that a new field would be put into use, but more commonly biosolids are applied to existing fields with a history of agricultural use.

It is possible that a former agricultural site would be converted for the purpose of developing a new composting facility, but this is not known.

c. Describe any structures on the site.

Unknown at this time, but generally not relevant to this proposal.

d. Will any structures be demolished? If so, what?

Demolition is not required for biosolids land application.

It is unknown whether demolition of existing structures and any proposed new compost facility would be required.

e. What is the current zoning classification of the site?

Land application sites are typically zoned for agricultural use.

Compost facilities would likely be zoned for light industrial or industrial uses.

f. What is the current comprehensive plan designation of the site?

Land application sites are typically designated as some form of rural agricultural.

g. If applicable, what is the current shoreline master program designation of the site?

Until individual sites are proposed it cannot be known if any part of a site is subject to shorelines jurisdiction. The County will avoid sites under shoreline jurisdiction simply because of the additional work required to obtain permit approvals.

h. Has any part of the site been classified as an "environmentally sensitive" area? If so, specify.

This cannot be ascertained until individual sites are identified. The County has determined that it will not apply biosolids in the High Susceptibility Areas of the Critical Aquifer Recharge Zone.
i. Approximately how many people would reside or work in the completed project?

Population densities in agricultural areas are typically lower, and no on-site residency is required for biosolids land application. In some cases the land owner or a tenant may reside at a residence on site.

It is unlikely that anyone would live on-site at a compost facility, but there could be a care taker or resident security person.

j. Approximately how many people would the completed project displace?

None.

k. Proposed measures to avoid or reduce displacement impacts, if any:

None are proposed.

l. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:

State biosolids rules specifically require that all facilities subject to permitting under the state biosolids program (includes biosolids land application sites and compost facilities) must be in compliance with applicable local rules and regulations, including zoning. Information on site zoning and adjacent land uses is required to be provided as part of a site specific land application plan and in the review of any proposed compost facility location.

9. Housing

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.

This project does not involve housing.

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.

None.

c. Proposed measures to reduce or control housing impacts, if any:

Not applicable.

10. Aesthetics

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?

No structures are associated with land application programs. Typical winter storage piles may be ten feet in height, and appear very similar to soils stockpiles.

At compost facilities, there may be administration buildings, and composting operations themselves are in some cases fully enclosed. The height of any such buildings is not known until a specific proposal for a new compost facility is developed.
b. What views in the immediate vicinity would be altered or obstructed?

At land application sites, storage piles will be visible during the winter. Generally these piles are about 10 feet in height and while noticeable, do not have a significant impact on views in the vicinity.

A compost facility would likely have some impact on views in the immediate vicinity if new buildings are constructed. Piles of feedstocks and finished product may also be visible.

b. Proposed measures to reduce or control aesthetic impacts, if any:

None are proposed for biosolids land application sites.

None are proposed at this time absent a clear proposal for a new compost facility, but use of compost in enhanced landscaping is a reasonable expectation at a new compost facility.

11. Light and Glare

a. What type of light or glare will the proposal produce? What time of day would it mainly occur?

Biosolids land application is typically a daytime operation although vehicles arriving early or leaving near dusk may be operating headlights.

Vehicles entering and leaving a compost facility may be operating headlights. On site equipment such as loaders may also use headlights. On site offices would require interior and exterior lighting. The compost facility itself would require some exterior lights if for no reason other than safety when personnel are on site before or after normal hours. It is likely that a compost facility would operate during normal business hours and employ a lighting regimen similar to operations with outdoor yards.

b. Could light or glare from the finished project be a safety hazard or interfere with views?

No safety hazard is anticipated. Light from a compost facility might be noticeable to persons living or working nearby. It is unknown whether it would interfere with views.

c. What existing off-site sources of light or glare may affect your proposal?

None.

d. Proposed measures to reduce or control light and glare impacts, if any:

None are proposed at this time nor are expected to be needed at land application sites. A compost facility might employ directional lighting and other lighting systems that minimize the amount of glare or light emissions from the facility. This is uncertain absent a specific proposal.

12. Recreation

a. What designated and informal recreational opportunities are in the immediate vicinity?

Biosolids land application is contemplated on private farmland. The most likely recreational opportunities are hunting and fishing (access), or possibly wildlife viewing. Cross country skiing or snowmobiling are also possibilities.

Recreational opportunities in the immediate vicinity of any proposed compost facility are not known at this time.
b. Would the proposed project displace any existing recreational uses? If so, describe.

Federal and state laws restrict access to land application sites for one year following land application. "Restrict" does not mean prohibit, but informed entry is expected. Generally, private landowners are not obligated to open their lands to public uses; consequently any impact would essentially be at the discretion of the owner.

It is unlikely that a new compost facility would displace any recreational uses.

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:

No special measures are proposed. At a minimum, proposed new sites are required to be posted for public notice, and the process of obtaining coverage under the state biosolids permit system is itself subject to a public notice process. Biosolids land application sites are required to be posted during the life of the site at common points of access, and along their perimeter advising interested persons of access restrictions and providing contact information. The information signs can be substituted for no trespassing signs in some cases. State biosolids program rules require that land owners sign a written consent prior to land application of biosolids so that they are aware of any site management or access restrictions that would ensue.

No measures to reduce the impact of a new compost facility on recreational activities are proposed at this time.

13. Historic and Cultural Preservation

a. Are there any places or objects listed on, or proposed for, national, state, or local preservation registers known to be on or next to the site? If so, generally describe.

Individual sites are not identified here. It is possible that places or objects registered or proposed for historical registers could be on or in the vicinity of a land application site or any proposed new compost facility. Biosolids land application would follow typical farming practices and impacts beyond those imposed by typical farming practices are not anticipated.

b. Generally describe any landmarks or evidence of historic, archaeological, scientific, or cultural importance known to be on or next to the site.

None can be identified at this time. Biosolids land application will occur on agricultural sites. It is possible that there may be sites of cultural or historic significance in the vicinity. Biosolids land application would follow typical farming practices and impacts beyond those imposed by typical farming practices are not anticipated.

c. Proposed measures to reduce or control impacts, if any:

Site specific land application plans are developed for individual sites. The permit process allows the Department of Ecology to impose additional or more stringent requirements as necessary to assure proper site management. Any identified aspect of cultural or historical significance can be addressed at the site specific level of review. Generally impacts of this nature are not reasonably anticipated since biosolids land application follows normal farming practices.

It is expected that the review process for any new composting facility would evaluate the proximity of natural, historical, or cultural features of interest and address them at that time.
14. Transportation

a. Identify public streets and highways serving the site, and describe proposed access to the existing street system. Show on-site plans, if any.

Routes of travel cannot be precisely identified at this time. It is expected that at least some land application sites will require transportation southbound on State Route 27 from Sprague Avenue. More specific routes cannot be determined at this time. Generally an all-weather access road is needed in order to facilitate winter access to a site.

Ingress/egress for compost facilities is an important consideration in the planning process. Sites must allow trucks of the expected size and weight to easily enter and exit a facility, as well as maneuver to the extent necessary while on site.

b. Is the site currently served by public transit? If not, what is the approximate distance to the nearest transit stop?

It is unlikely that public transit will be available from any of the potential land application sites, which are expected to be rural agricultural in nature.

It is possible that transit might serve the location of a proposed new compost facility, but this is not known.

c. How many parking spaces would the completed project have? How many would the project eliminate?

Parking is not applicable for land application sites.

A compost facility would need to employ parking for several employees as well as guests and customers. The amount of parking required is not known at this time.

d. Will the proposal require any new roads or streets, or improvements to existing roads or streets, not including driveways? If so, generally describe (indicate whether public or private).

Generally no. It is possible that some improvement could be made to site access for a desirable land application site.

Depending on the location selected, a new compost facility could require improvements to adjacent streets, particularly for points of ingress and egress.

e. Will the project use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.

The SCRWRF site is bounded to the south by railroad property with active railroads. However, biosolids transport vehicles will enter and exit the site from either the west or the north. A rail spur might be constructed at the south side of the SCRWRF site. Biosolids may be transported via rail from this spur in the future.

f. How many vehicular trips per day would be generated by the completed project? If known, indicate when peak volumes would occur.

For any particular land application site the number of trips per day depends on the size of the trucks servicing the treatment works and the amount of material directed to the site. Seven truck trips per week are projected in 2012, growing to about 11 truck trips per week in 2030; on average then about
1.5 vehicle trips per day which might be directed over the course of a season to one or more land application sites.

For a compost facility it is reasonable to assume that all biosolids truck trips would be to the facility in the absence of any land application program. In addition, an undetermined number of truck trips would be needed for the delivery of bulking agent or other feedstocks, plus daily employee commutes. Also, outgoing truck trips related to distribution of the finished compost product would at least equal the number of truck trips bringing biosolids into the composting facility.

g. Proposed measures to reduce or control transportation impacts, if any:

It is good common practice to select major roads and truck routes, and avoid transportation through neighborhood areas as much as possible. Larger trucks generally mean fewer trips and reduce the cost per unit of weight or volume.

15. Public Services

a. Would the project result in an increased need for public services (for example: fire protection, police protection, health care, schools, other)? If so, generally describe.

This project results from an increased need for public service (i.e. water reclamation). Land application sites generally do not increase the need for public services.

A new compost facility would create some incremental increase in need for police and fire protection.

b. Proposed measures to reduce or control direct impacts on public services, if any.

This proposal is part of a lengthy comprehensive public planning process intended to achieve goals.

16. Utilities

a. Circle utilities currently available at the site: electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other.

Unknown at this time. Service level utilities are generally not available or required at land application sites.

c. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed.

None are proposed or required for land application sites.

A compost facility would need electric and water from some source. A sanitary connection may or may not be needed for facility wastewater. A sanitary system would likely be required for employees.
C. SIGNATURE

I, the undersigned, swear under the penalty of perjury that the above responses are made truthfully and to the best of my knowledge. I also understand that, should there be any willful misrepresentation or willful lack of full disclosure on my part, the Agency may withdraw any Determination of Non-Significance that it might issue in reliance upon this checklist.

Proponent: Spokane County Public Works Department, Division of Utilities
1026 West Broadway Avenue
Spokane, WA 99260-0430
(509) 477-3604

[Signature]
N. Bruce Rawls, P.E.
Utilities Director

April 6, 2008
Date

FOR STAFF USE ONLY

Staff Member(s) Reviewing Checklist: [Signature]

K. David Moss, P.E.
Water Reclamation Manager

Based on this staff review of the environmental checklist and other pertinent information, the staff:

☐ Concludes that there are no probable significant adverse impacts and recommends a Determination of Non-Significance.

☐ Concludes that probable significant adverse environmental impacts do exist for the current proposal and recommends a Mitigated Determination of Non-Significance with conditions.

☐ Concludes that there are probable significant adverse environmental impacts and recommends a Determination of Significance.
Appendix D - Summary of April 2008 Public Meeting
Thank you for attending tonight’s meeting. To ensure that the project team understands and can consider your concerns, issues, and opinions, please answer the following questions.

**Biosolids Management Questions**

1. How much did you know about Biosolids and the available alternatives for Biosolids Management before this meeting?
   - A lot - 1  Some - 1  Very Little - 0  None – 1
   Comments:
   - I’m a certified master composter.

2. After attending this public meeting, how well do you understand the available alternatives considered by Spokane County for Biosolids Management?
   - A lot - 3  Some - 0  Very Little - 0  None – 0
   Comments:
   - None.

3. Do you understand the two preferred Biosolids Management alternatives selected by Spokane County?
   - No - 0  Yes - 3
   Comments:
   - None.

4. Based on your understanding of Biosolids and the available alternatives for Biosolids Management, how supportive are you of the preferred alternatives?
   - Land Application:  A lot – 1   Some – 2   Very Little - 0   None – 0
   - Composting:  A lot – 1   Some – 2   Very Little – 0   None – 0
   Comments:
   - None.

5. Based on your understanding of Biosolids, and the County’s preferred alternatives, do you have concerns about public health or the environment?
   - Land Application--Public Health:  No - 1  Yes - 1  --Environment:  No - 1  Yes - 1
   - Composting--Public Health:  No - 1  Yes - 1  --Environment:  No - 1  Yes - 1
   Comments:
   - None.
6. Would you be willing to pay an additional $2 to $4 per month in sewer fees to have compost produced from the Biosolids?

   No - 0  Yes - 3

Comments:
   • Am one of, unfortunately, the very few who knows this expense to be better health insurance than that offered by the sickness insurance industry – aka “Health” Insurance.

Biosolids Management Feedback

7. Please share any other questions, concerns, or ideas that will help Spokane County in the development of the Biosolids Management Plan.

   • None.

Comment Period ends April 25, 2008

Meeting Evaluation Questions

1. Does the County do an effective job of notifying customers and residents with regard to regional wastewater issues?

   Yes - 2  No - 0  Unsure - 1

Comments:
   • I am unsure because this is the first I’ve been aware of.

2. Overall, how would you rate tonight’s meeting format, presentation, and opportunities to provide comments?

   Excellent - 2  Good - 1  Fair - 0  Poor - 0

   What could have made the meeting better or more helpful to you?
   • None

Optional:

1. Name: Tom Larson  E-mail:
Day phone: 509-998-4495  Evening phone:
Address:  PO Box 457
Greenacres, WA 99016

Follow-up: Would you like us to contact you to discuss your Questionnaire?  No

2. Name: RMW Larson  E-mail: osiandoe@yahoo.com
Day phone: 509-927-2559  Evening phone: Same.
Address:  PO Box 457
Greenacres, WA 99016
Follow-up: Would you like us to contact you to discuss your Questionnaire?  Yes No

3. Name: E-mail:
Day phone: Evening phone:
Address:

Follow-up: Would you like us to contact you to discuss your Questionnaire?  Yes - 0 No – 0