

Eureka Springs-Bio-Solids Report | 2015

The bio-solids and soil analyses conducted were performed in accordance with EPA Document SW-846, "Test Methods for Evaluation of Solid Waste"

Application Dates- 05/28/2015, 05/29/2015

Locations- Section 31, Township 20 North, Range 25 West, 40 Acres & Section 36, Township 20, North, Range 26, 40 Acres

Volume of Bio-solids Applied- 0.5898 dry tons/acre-year – 8,492.4 gallon/ acre-year

Method of Disposal - Spreader Truck

Hauler- Duane Coatney- Received Copy

Crop Grown- Fescue

Total Kjeldahl Nitrogen Applied- 63191.87 mg/kg, Total Solids 60.10%, Volatile Solids 84.99%, Nitrate + Nitrite Nitrogen 1834.22 mg/kg, Total Potassium 7188.50 mg/kg, PH 6.59 S.U.

Total Elements Applied – Mercury .0113lb/ac, Ammonia Nitrogen 183.3711 lb./ac, Chromium .2754 lb./ac, Nickel .3740 lb./ac, Copper 29.6480 lb./ac, Zinc 10.9990 lb./ac, Arsenic .0850 lb./ac, Selenium .0850 lb./ac, Molybdenum .1105lb/ac, Fecal Coliform 149 lb./ac, Cadmium .0805 lb./ac, Lead .5355 lb. /ac, Phosphorous 3608.6466 lb. /ac

Total Elements applied to date- Mercury .0476 lb./ac, Ammonia Nitrogen 1,244.3697 lb./ac, Chromium 1.1991 lb./ac, Nickel 1.0356 lb./ac, Copper 53.3463 lb./ac, Zinc 36.0571 lb./ac, Arsenic .5489 lb./ac, Selenium .5545 lb./ac, Molybdenum .8934 lb./ac, Fecal Coliform 153 lb./ac, Cadmium .9387 lb./ac, Lead 4.9782 lb./ac, Phosphorous 6023.5078 lb./ac

Enclosures:

- 1) Bio-solids, grab sample
- 2) Copies of soil analyses for each site

Environmental Services Company, Inc.

Corporate Office
 13715 West Markham
 Little Rock, AR 72211
 Tel. (501)221-2565 Fax (501)221-1341

Northwest Arkansas Branch
 1107 Century Avenue
 Springdale, AR 72762
 Tel. (479)750-1170 Fax (479)750-1172

Control Number: 1501020125
 Customer Name : EUREKA SPRINGS, CITY OF
 Customer Number : 2203
 Report Date : 01/23/15

Sample Date : 01/08/15
 Sample Time : 1115
 Sample Type : GRAB
 Sample From : 2203 BIOSOLIDS

Collected By: TL
 Delivery By : WDS
 Work Order :
 Purchase Order :

| Analysis | | | Laboratory Analysis | | | | Quality Assurance | | |
|----------|------|-----|-------------------------|----------------|-------|----------|--------------------|--------------------|-----------------------|
| Date | Time | By | Parameter | Result | Notes | Quantity | Method | Precision % RPD | Accuracy % Recover |
| 01/14 | 1000 | RAH | Mercury Digestion | 1 | | | 02/2005 EPA 245.7 | 0.00 | 100.0 |
| 01/12 | 0930 | RAH | Metals Digestion | 1 | | | 1996 EPA 3050B | 0.00 | 100.0 |
| 01/13 | 0900 | TSB | Ammonia Nitrogen | 1 | | | SM 1997 4500-NH3 C | 1.15 | 96.4 |
| 01/14 | 0954 | RAH | Mercury | 4204.33 mg/kg | | | SW-846 7471 | 0.13 | 108.5 |
| 01/13 | 0830 | TSB | Kjeldahl Nitrogen Total | < 0.8119 mg/kg | | | SM 1997 4500-NorgB | 1.69 | 98.4 |
| 01/13 | 1000 | TSB | Nitrate Nitrogen | 63875.87 mg/kg | | | SM 2000 4500-NO3 E | 0.49 | 99.4 |
| 01/13 | 1000 | TSB | Nitrite Nitrogen | 482.144 mg/kg | | | SM 2000 4500-NO2 B | 0.90 | 99.4 |
| 01/16 | 1144 | RAH | Sodium | 19.575 mg/kg | | | SW846 6020A | 3.02 | 123.0 |
| 01/16 | 1144 | RAH | Magnesium, Total | 131.00 mg/kg | | | SW846 6020A | 2.40 | 85.3 |
| 01/16 | 1144 | RAH | Potassium, Total | 259.50 mg/kg | | | SW846 6020A | 4.02 | 123.7 |
| 01/16 | 1144 | RAH | Calcium, Total | 261.00 mg/kg | | | SW846 6020A | 1.99 | 118.5 |
| 01/22 | 1245 | KIK | pH, Soil | 631.50 mg/kg | | | SW846 6020A | 0.00 | 0.0 |
| 01/16 | 1144 | RAH | Chromium, Total | 7.14 S.U. | | | SM 2000 4500-H+ B | 0.91 | 89.8 |
| 01/16 | 1144 | RAH | Nickel, Total | < 2.50 mg/kg | | | SW846 6020A | 2.58 | 90.6 |
| 01/16 | 1144 | RAH | Copper, Total | 3.00 mg/kg | | | SW846 6020A | 1.62 | 98.0 |
| 01/15 | 1300 | RHB | Solids, % Volatile | 28.50 mg/kg | | | SW846 6020A | 0.73 | 0.0 |
| 01/16 | 1144 | RAH | Zinc, Total | 83.728 % | | | SM 1997 2540 G | 1.78 | 98.1 |
| 01/16 | 1144 | RAH | Arsenic, Total | 53.00 ug/kg | | | SW846 6020A | 1.57 | 94.5 |
| 01/16 | 1144 | RAH | Selenium, Total | < 2.50 mg/kg | | | SW846 6020A | 1.78 | 105.6 |
| 01/16 | 1144 | RAH | Molybdenum, Total | < 2.50 mg/kg | | | SW846 6020A | 2.75 | 96.6 |
| 01/16 | 1144 | RAH | Cadmium, Total | < 2.50 mg/kg | | | SW846 6020A | 0.23 | 98.4 |

* QA data shown is from a different sample or standard on the same date.

Report for Control Number: 1501020125 Continued on Next Page

Customer Name : EUREKA SPRINGS, CITY OF
Control Number: 1501020125

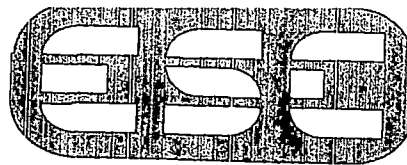
| Analysis | | | Laboratory Analysis | | | | Quality Assurance | | |
|----------|------|-----|-------------------------|------------|-------|----------|-------------------------|--------------------|------------------------|
| Date | Time | By | Parameter | Result | Notes | Quantity | Method | Precision % RPD | Accuracy % Recovery |
| 01/13 | 1130 | TSB | Solids, % Total | 12.317 % | | | | | |
| 01/16 | 1144 | RAH | Lead, Total | 5.00 mg/kg | | | SM 1997 2540 G | 0.91 | N/A |
| 01/16 | 1144 | RAH | Sodium Absorption Ratio | 0.1567 | | | SW846 6020A AGRN 724 | 1.74 3.02 | 83.6 123.0 |

* QA data shown is from a different sample or standard on the same date.

All equipment used is checked and/or calibrated daily. All NPDES testing is conducted in accordance with 40 CFR Part 136. A minimum of 10% spiked and duplicate samples is run on each parameter where applicable for Quality Assurance purposes. Quality Assurance Plan on file with Arkansas Department of Environmental Quality. Analysis time indicates the time of the start of the analytical batch in which the specific sample was included.

Signature Richard Brown
Environmental Services Co., Inc.

Environmental Services Company, Inc.
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 13715 West Markham P.O. Box 55146
 Little Rock, AR 72211 Little Rock, AR 72215
 website: www.esclabs.com



Environmental Services Company, Inc.
 Northwest Branch
 1107 Century
 Springdale, AR 72764

Phone: 501-221-2565 Fax: 501-221-1341

CHAIN OF CUSTODY

Phone 479-750-1170 Fax: 479-750-1172

| Client Information | | | | Project Information | | | | Requested Parameters | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---------------|-------------------------------------|-------|---|-----------|---------------------------------------|----------|--|---|--|----|--------|----|--------|----|-------|----|--|----|----|----|----|----|-------|--------------------|--------------------|--------------------|-----|------------------------|----|----|---|
| Company Name: Eureka Springs | | Address: 3174 E. Van Buren | | Permit/Project #: BIOSOLIDS | | Purchase Order #: | | As, Cd, Cu, Pb, Hg, Mo, Ni, Se Zn, TP, TK, Mg, Na, Ca, PCB's NH ₃ -N, NO ₃ -N, NO ₂ -N TKN, Sodium Absorption Rate TS, pH | | | | | | | | | | | | | | | | | | | | | | | | |
| Telephone: (479) 253-7410 | | FAX: (479) 253-6974 | | Sampler Name(s): <u>TERRY R LONG</u> | | and Signature(s): <u>Terry R Long</u> | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ESWWTP@YAHOO.COM | | ESC Client Number: 2203 - BIOSOLIDS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sample Identification | | Sample Collection | | | | Sample Containers | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Identification | ESC Control # | Date | Time | Type | Matrix | Type | Volume | Preservative | # | As | Cd | Cu | Pb | Hg | Mo | Ni | Se | Zn | TP | TK | Mg | Na | Ca | PCB's | NH ₃ -N | NO ₃ -N | NO ₂ -N | TKN | Sodium Absorption Rate | TS | pH | |
| 2203 Biosolids | 1901620125 | 1/8/15 | 11:15 | GRAB | BIOSOLIDS | Plastic | 1-Gallon | None | 1 | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Relinquished By: (Signature and Printed Name) | | Date | Time | Received By: (Signature and Printed Name) | | Date | Time | Custody Seals: | | Used? <input checked="" type="checkbox"/> Intact? <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | |
| Relinquished By: (Signature and Printed Name) | | Date | Time | Received By: (Signature and Printed Name) | | Date | Time | Turnaround: | | Regular <input checked="" type="checkbox"/> Special <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | |
| Relinquished By: (Signature and Printed Name) | | Date | Time | Received for Lab By: (Signature and Printed Name) | | Date | Time | Were samples properly preserved: | | Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | |
| Comments: | | | | FLOW DATA | | Field Test | | Time | | Analyst | | Result | | Result | | Units | | | | | | | | | | | | | | | | |
| | | | | Analyst: | | pH: | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | Time: | | Temp.: | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | Reading: | | DO: | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | Units: | | Debris: | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cool all samples to 6 degrees C. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | Chlorinated? Yes No This Document is Page ___ of ___ | | | | | | | | | | | | | | |

Cooperative Extension Service
Soil Testing And Research Laboratory
Marianna, AR 72360
<http://soiltest.uark.edu>

The University of Arkansas is an equal opportunity/affirmative action institution.

| | |
|------------------------------------|------------------------------|
| ES PUBLIC WORKS - ATTN JODI | Client ID: 4792539600 |
| 3174 E VAN BUREN | |
| EUREKA SPRINGS | AR 72632 |
| Date Processed: | 7/21/2015 |
| Field ID: | WESTA |
| Acres: | 10 |
| Lime Applied in the last 4 years: | No |
| Leveled in past 4 years: | No |
| Irrigation: | Unknown |
| County: | Carroll |
| Lab Number: | 68814 |
| Sample Number: | 3150652 |

1. Nutrient Availability Index

| Nutrient | Concentration | | Soil Test Level (Mehlich 3) |
|----------|---------------|---------|-----------------------------|
| | ppm | lb/acre | |
| P | 793 | 1586 | Above Optimum |
| K | 536 | 1072 | Above Optimum |
| Ca | 2029 | 4058 | -- |
| Mg | 339 | 678 | -- |
| SO4-S | 33 | 66 | -- |
| Zn | 72.5 | 145 | -- |
| Fe | 155 | 310 | -- |
| Mn | 78 | 156 | -- |
| Cu | 17.3 | 34.6 | -- |
| B | 0.5 | 1 | -- |
| NO3-N | | | -- |

2. Soil Properties

| Property | Value | Units | | |
|--------------------------------------|-----------------------------|----------|------|------|
| Soil pH (1:2 soil-water) | 6 | -- | | |
| Soil EC (1:2 soil-water) | | umhos/cm | | |
| Soil Estimated CEC | 17.98 | cmolc/kg | | |
| Organic Matter (Loss on Ignition) | | % | | |
| Estimated Soil Texture | Silty Clay Loam - Clay Loam | | | |
| Estimated Base Saturation (%) | | | | |
| Total | Ca | Mg | K | Na |
| 80.53 | 56.43 | 15.71 | 7.64 | 0.75 |

3. Recommendations (Notice: State and/or federal nutrient management regulations may supersede these agronomic recommendations.)

| Crop | N | P2O5 | K2O | SO4-S | Zn | B | Lime |
|-----------|---------------------|------|-----|-------|----|---|------|
| Last Crop | ----- lb/acre ----- | | | | | | |
| Crop 1 | 60 | 0 | 0 | 0 | 0 | 0 | 0 |
| Crop 2 | | | | | | | |
| Crop 3 | | | | | | | |

4. Crop 1 Notes:

Apply the recommended rate of N, P, and K in late winter. For higher production apply an additional 50 lb N/Acre after every 4 to 6 weeks of grazing. For fall/winter grazing, apply 50 lbs N/Acre in late summer.

5. Crop 2 Notes:

6. Crop 3 Notes:

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| 3174 E VAN BUREN | | |
| EUREKA SPRINGS | AR | 72632 |
| Date Processed: | 7/21/2015 | |
| Field ID: | WESTB | |
| Acres: | 10 | |
| Lime Applied in the last 4 years: | No | |
| Leveled in past 4 years: | No | |
| Irrigation: | Unknown | |
| County: | Carroll | |
| Lab Number: | 68815 | |
| Sample Number: | 3150653 | |

1. Nutrient Availability Index

| Nutrient | Concentration | | Soil Test Level (Mehlich 3) |
|----------|---------------|---------|--------------------------------|
| | ppm | lb/acre | |
| P | 231 | 462 | Above Optimum |
| K | 288 | 576 | Above Optimum |
| Ca | 1464 | 2928 | -- |
| Mg | 320 | 640 | -- |
| SO4-S | 16 | 32 | -- |
| Zn | 12.6 | 25.2 | -- |
| Fe | 114 | 228 | -- |
| Mn | 66 | 132 | -- |
| Cu | 7.5 | 15 | -- |
| B | 0.2 | 0.4 | -- |
| NO3-N | | | -- |

2. Soil Properties

| Property | Value | Units | | |
|--------------------------------------|-----------|----------|------|------|
| Soil pH (1:2 soil-water) | 6.5 | -- | | |
| Soil EC (1:2 soil-water) | | umhos/cm | | |
| Soil Estimated CEC | 13.27 | cmolc/kg | | |
| Organic Matter (Loss on Ignition) | | % | | |
| Estimated Soil Texture | Silt Loam | | | |
| Estimated Base Saturation (%) | | | | |
| Total | Ca | Mg | K | Na |
| 81.16 | 55.17 | 20.10 | 5.57 | 0.33 |

3. Recommendations (Notice: State and/or federal nutrient management regulations may supersede these agronomic recommendations.)

| Crop | N | P205 | K2O | SO4-S | Zn | B | Lime |
|---|---------------------|------|-----|-------|----|---|------|
| Last Crop Pasture (203) | ----- lb/acre ----- | | | | | | |
| Crop 1 Pasture - Cool-Season Grasses (MNT) (203) | 60 | 0 | 0 | 0 | 0 | 0 | 0 |
| Crop 2 | | | | | | | |
| Crop 3 | | | | | | | |

4. Crop 1 Notes:

Apply the recommended rate of N, P, and K in late winter. For higher production apply an additional 50 lb N/Acre after every 4 to 6 weeks of grazing. For fall/winter grazing, apply 50 lbs N/Acre in late summer.

5. Crop 2 Notes:

6. Crop 3 Notes:

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|------------------------------------|-----------|------------------------------|
| ES PUBLIC WORKS - ATTN JODI | | Client ID: 4792539600 |
| 3174 E VAN BUREN | | |
| EUREKA SPRINGS | AR | 72632 |
| Date Processed: | 7/21/2015 | |
| Field ID: | EASTA | |
| Acres: | 10 | |
| Lime Applied in the last 4 years: | No | |
| Leveled in past 4 years: | No | |
| Irrigation: | Unknown | |
| County: | Carroll | |
| Lab Number: | 68816 | |
| Sample Number: | 3150654 | |

1. Nutrient Availability Index

| Nutrient | Concentration | | Soil Test Level (Mehlich 3) |
|----------|---------------|---------|--------------------------------|
| | ppm | lb/acre | |
| P | 555 | 1110 | Above Optimum |
| K | 250 | 500 | Above Optimum |
| Ca | 3601 | 7202 | -- |
| Mg | 264 | 528 | -- |
| SO4-S | 21 | 42 | -- |
| Zn | 46.3 | 92.6 | -- |
| Fe | 158 | 316 | -- |
| Mn | 36 | 72 | -- |
| Cu | 9.8 | 19.6 | -- |
| B | 0.7 | 1.4 | -- |
| NO3-N | | | -- |

2. Soil Properties

| Property | Value | Units | | |
|--------------------------------------|-------|----------|------|------|
| Soil pH (1:2 soil-water) | 6.8 | -- | | |
| Soil EC (1:2 soil-water) | | umhos/cm | | |
| Soil Estimated CEC | 23.39 | cmolc/kg | | |
| Organic Matter (Loss on Ignition) | | % | | |
| Estimated Soil Texture | Clay | | | |
| Estimated Base Saturation (%) | | | | |
| Total | Ca | Mg | K | Na |
| 89.31 | 76.98 | 9.41 | 2.74 | 0.19 |

3. Recommendations (Notice: State and/or federal nutrient management regulations may supersede these agronomic recommendations.)

| Crop | N | P2O5 | K2O | SO4-S | Zn | B | Lime |
|---|---------------------|------|-----|-------|----|---|------|
| Last Crop Pasture (203) | ----- lb/acre ----- | | | | | | |
| Crop 1 Pasture - Cool-Season Grasses (MNT) (203) | 60 | 0 | 0 | 0 | 0 | 0 | 0 |
| Crop 2 | | | | | | | |
| Crop 3 | | | | | | | |

4. Crop 1 Notes:

Apply the recommended rate of N, P, and K in late winter. For higher production apply an additional 50 lb N/Acre after every 4 to 6 weeks of grazing. For fall/winter grazing, apply 50 lbs N/Acre in late summer.

5. Crop 2 Notes:

6. Crop 3 Notes:

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| | |
|------------------------------------|------------------------------|
| ES PUBLIC WORKS - ATTN JODI | Client ID: 4792539600 |
| 3174 E VAN BUREN | |
| EUREKA SPRINGS | AR 72632 |
| Date Processed: | 7/21/2015 |
| Field ID: | EASTB |
| Acres: | 10 |
| Lime Applied in the last 4 years: | No |
| Leveled in past 4 years: | No |
| Irrigation: | Unknown |
| County: | Carroll |
| Lab Number: | 68817 |
| Sample Number: | 3150655 |

1. Nutrient Availability Index

| Nutrient | Concentration | | Soil Test Level (Mehlich 3) |
|----------|---------------|---------|--------------------------------|
| | ppm | lb/acre | |
| P | 114 | 228 | Above Optimum |
| K | 307 | 614 | Above Optimum |
| Ca | 1470 | 2940 | -- |
| Mg | 237 | 474 | -- |
| SO4-S | 20 | 40 | -- |
| Zn | 10.9 | 21.8 | -- |
| Fe | 133 | 266 | -- |
| Mn | 327 | 654 | -- |
| Cu | 3.5 | 7 | -- |
| B | 0.2 | 0.4 | -- |
| NO3-N | | | -- |

2. Soil Properties

| Property | Value | Units | | |
|--------------------------------------|-----------|----------|------|------|
| Soil pH (1:2 soil-water) | 6.5 | -- | | |
| Soil EC (1:2 soil-water) | | umhos/cm | | |
| Soil Estimated CEC | 12.65 | cmolc/kg | | |
| Organic Matter (Loss on Ignition) | | % | | |
| Estimated Soil Texture | Silt Loam | | | |
| Estimated Base Saturation (%) | | | | |
| Total | Ca | Mg | K | Na |
| 80.24 | 58.10 | 15.61 | 6.22 | 0.31 |

3. Recommendations

(Notice: State and/or federal nutrient management regulations may supersede these agronomic recommendations.)

| Crop | N | P2O5 | K2O | SO4-S | Zn | B | Lime |
|---|---------------------|------|-----|-------|----|---|------|
| Last Crop Pasture (203) | ----- lb/acre ----- | | | | | | |
| Crop 1 Pasture - Cool-Season Grasses (MNT) (203) | 60 | 0 | 0 | 0 | 0 | 0 | 0 |
| Crop 2 | | | | | | | |
| Crop 3 | | | | | | | |

4. Crop 1 Notes:

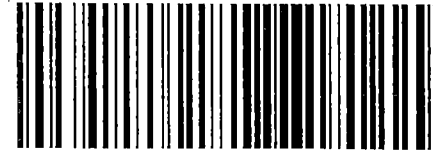
Apply the recommended rate of N, P, and K in late winter. For higher production apply an additional 50 lb N/Acre after every 4 to 6 weeks of grazing. For fall/winter grazing, apply 50 lbs N/Acre in late summer.

5. Crop 2 Notes:

6. Crop 3 Notes:

City of Eureka Springs
Department of Public Works
3174 East Van Buren
Eureka Springs, AR 72632-9201

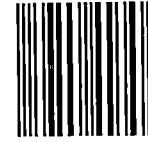
CERTIFIED MAIL®



7015 0640 0004 2399 2817



1000



72118

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72632
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ADEQ-Water Permits
5301 Northshore Drive
North Little Rock, AR 72118-5317

