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# ANNUAL REPORT CROPPING YEAR 2017 MN 0040878

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# Minnesota Pollution Control Agency Biosolids Annual Report

The yearly completion and submittal of this form, including the certification statements, will fulfill the requirements of MN Rule Ch. 7041 for annual reporting of biosolids landspreading activities. This form must be submitted to the MPCA by December 31 following the cropping year. When bulk biosolids are applied, this form must be prepared by, or under the supervision of, a Type IV certified operator or inspector.

**Reporting Period: September 1,** 2016 **through August 31,** 2017

**Facility Name:** City of St. Cloud **NPDES or SDS Permit Number** MN0040878  
**Contact Person:** Sam Lobby **Phone Number** 320-255-7226  
**Work Address:** 525 60th Street South, St. Cloud, MN 56301

**Check here if biosolids were NOT land applied during this cropping season:**

Total quantity of biosolids land applied as bulk material: 12,966,278 Gallons or          Wet tons AND 2,075 Dry tons

Total quantity of Class A biosolids sold or given away in bags or other containers: NA Dry Tons

Total quantity of biosolids transferred to another facility: NA Dry Tons OR - Gallons

Transferred to what facility: NA Contact person / phone # of facility NA / NA

### PATHOGEN REDUCTION

Select the option/s used to meet pathogen reduction requirements:

**Class B Options:**

1.  Geometric mean of fecal coliform determined
2. Process to Significantly Reduce Pathogens (PSRP) monitored:  
 Aerobic  Anaerobic  Air dry  Compost  Lime
3.  Process determined equivalent to a PSRP process monitored

**Class A Options:** 1 - 6 listed under 7041.1300, subp. 2, C:

- 1  2  3  4  5  6

Describe how the Class A or Class B pathogen reduction requirement is met. For example, indicate what information was used and how it was evaluated to determine compliance. [Do not submit daily data.]

Temperature readings are recorded and solids retention times are calculated.  
 \_\_\_\_\_  
 Temperatures are maintained in a range of 95°F to 100°F and solids retention  
 \_\_\_\_\_  
 time is kept at greater than 15 days at those temperatures. Average SRT for  
 \_\_\_\_\_  
 cropping year 2017 was 43.47 days. (Data included in report)  
 \_\_\_\_\_  
 \_\_\_\_\_

### VECTOR ATTRACTION REDUCTION

Select the option/s by which vector attraction reduction was met:

[For a detailed description of these options, see your Biosolids

Manual or Minn. R. ch. 7041.1400, subp. 2]

- A. 38% Volatile Solids Reduction (VSR)
- B. Bench Scale - Anaerobically Digested
- C. Bench Scale - Aerobically Digested
- D. SOUR Test: ≤ 1.5 mg oxygen/hour at 20 C
- E. Composted [aerobic /high temperature]
- F. Lime or Alkaline Stabilization
- G. Dried to 75% - for Stabilized Solids
- H. Dried to 90% - for Unstabilized Solids
- I. Injected  J. Incorporated within 6 hours of application

For options A through H only, describe how the option was met. If VSR is calculated, indicate which equation was used, ie. Van Kleek.

The St. Cloud WWTF operates its digesters at a steady state, continuous  
 \_\_\_\_\_  
 mix with no grit accumulation or decant, therefore the Van Kleek equation  
 \_\_\_\_\_  
 is used to determine Volatile Solids Reduction (VSR). Average VSR for  
 \_\_\_\_\_  
 cropping year 2017 was 61.48%. (Data included in report)  
 \_\_\_\_\_

## CERTIFICATIONS

**1. NOTE:** The certification statement required for checking with the permitting authority on whether a site has reached its cumulative loading limits and how this was done is not included on this form. This is kept in your records but not reported. [See Minn. R. ch. 7041.1000 subpart 2, item B for the requirement and 7041.1600 subpart 3, item M for the certification statement.] Copies of the certification statement are included in the appendix of your Biosolids Manual.

### **2. MINNESOTA ANNUAL REPORT FORM CERTIFICATION for TYPE IV OPERATOR OR INSPECTOR:**

I certify that the attached forms were prepared by myself or under my supervision.

\_\_\_\_\_  
*Signature of Type IV Certified Operator or Inspector*

\_\_\_\_\_  
*Date*

### **3. BIOSOLIDS PREPARER CERTIFICATION FOR PATHOGEN REDUCTION and VECTOR ATTRACTION REDUCTION OPTIONS A THROUGH H: [see page 1 of this form for a list of options A - H]**

I certify, under penalty of law, that the information that will be used to determine compliance with the Pathogen Requirements in 7041.1300, subp. 2, or 7041.1300, subp.3, and the Vector Attraction Requirement in \_\_\_\_\_ A \_\_\_\_\_ [insert one of the vector attraction reduction requirements in 7041.1400, Subp., A-H, if one of those requirements is met ] has been prepared under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate the information used to determine that the pathogen requirements A [and vector attraction reduction requirements, if applicable] have been met. I am aware that there are significant penalties for false certification, including the possibility of fine and imprisonment.

\_\_\_\_\_  
*Signature*

Patrick Shea, Public Services Director

\_\_\_\_\_  
*Date*

### **4. BIOSOLIDS APPLIER CERTIFICATION FOR MANAGEMENT PRACTICES and VECTOR ATTRACTION REDUCTION OPTIONS I and J:**

I certify, under penalty of law, that the information that will be used to determine compliance with the Management Practices in 7041.1200, the Site Restrictions in 7041.1300, subp. 3, item D, and the Vector Attraction Requirement in \_\_\_\_\_ I \_\_\_\_\_ [Insert 7041.1400, subp. 2, I or J, if applicable] for each site on which bulk biosolids is applied has been prepared under my direction and supervision according to the system designed to ensure that qualified personnel properly gather and evaluate the information used to determine that the management practices and site restrictions have been met. I am aware that there are significant penalties for false certification including the possibility of fine and imprisonment.

\_\_\_\_\_  
*Signature*

Patrick Shea, Public Services Director

\_\_\_\_\_  
*Date*

Management practices were met by: [Check appropriate boxes for compliance descriptions or add another description if applicable]

Biosolids were applied on sites approved by the MPCA according to Minn. R. ch. 7041.0800.

Biosolids were applied according to the soil, slope, and separation distance requirements of Minn. R. Ch. 7041.1200.

\_\_\_\_\_  
 A detailed description of how agronomic rate requirements were met is provided on page 3 of this form.

The farmer was notified of the applicable site restrictions for harvesting crops, grazing, and public access.

December 22, 2017

Water Quality Submittals  
Minnesota Pollution Control Agency  
520 Lafayette Road  
St. Paul, MN 55155

Sheryl Bock  
Biosolids Coordinator  
Minnesota Pollution Control Agency  
7678 College Road, Suite 105  
Baxter, MN 56425

RE: St. Cloud Wastewater Treatment Facility  
NPDES Permit No. MN0040878  
**2017 Biosolids Management Program Annual Report**

Dear Ms. Bock:

Enclosed is the City of St. Cloud's Cropping Year 2017 Biosolids Management Program Annual Report.

Highlights of the Cropping Year are listed below.

- The St. Cloud Biosolids Management Program has continued with certification at Platinum level for the Environmental Management System through the National Biosolids Program. The Annual Report for Interested Parties is attached for your reference as an appendix.
- St. Cloud Biosolids Product was injected in 100% of applications.
- Beginning in 2016, a 20 kWh rooftop solar panel from the "Made in Minnesota Program", and a 220 kWh "Behind the Meter Solar Site" were installed at the facility. Additionally, a 633 kWh Biofuel Generator was installed and commissioned in February, 2017. The Solar and Biofuel projects have significantly reduced consumption of purchased energy at SCWWTF
- In July, 2017, the Notice to Proceed was issued to the contractor for the Nutrient Recovery and Re-use (NR2) project. The project consists of rehabilitation of existing solids processing equipment and installation of dewatering solids conditioning equipment. Construction is anticipated to be completed by the end of 2018.

Please contact me with questions pertaining to this report or the City of St. Cloud's Biosolids Management Program at 320-255-7226 or [samuel.lobby@ci.stcloud.mn.us](mailto:samuel.lobby@ci.stcloud.mn.us).

Regards,

Sam Lobby  
Environmental Compliance Specialist

C Patrick Shea, Public Services Director  
Tracy Hodel, Assistant Public Utilities Director  
Emma Larson, Utilities Water Quality Coordinator  
Justin Barrick, Water Quality Compliance & Enforcement, MPCA

## St. Cloud Wastewater Treatment Facility

### Pathogen Reduction Cropping Year 2017

Data Tracking for Calculating Pathogen Reduction; Solids Retention Time

#### Monthly Averages

Month-Year	SRT
September-16	34.65
October-16	40.82
November-16	52.80
December-16	38.49
January-17	38.83
February-17	46.80
March-17	37.22
April-17	42.83
May-17	61.58
June-17	39.43
July-17	45.96
August-17	42.26
<b>2017 CY Avg.</b>	<b>43.47</b>

*Temperature must be between 95<sup>0</sup>F and 131<sup>0</sup>F for at least 15 days  
Temperature recordings are kept on the daily operators sheet and recorded in the WW Report*

Option Used to Meet Pathogen Reduction Requirements: **Anaerobic Digestion**

Solids Retention Time (SRT) (days) = Mass of biosolids in digester/average mass of biosolids entering or leaving digester per day

#### Formulas

Primary Digestion SRT = volume in digester (gal)/volume entering digester (gal/day)

Primary Digestion Volume = 572,220 + 572,220 = 1,144,000 gallons  
with an average 4' overflow = 1,144,000 + 84,000 = 1,228,000 gallons

## St. Cloud Wastewater Treatment Facility

### Vector Attraction Reduction Cropping Year 2017

Data Tracking for Calculating Vector Attraction Reduction

#### Monthly Averages

Month-Year	%VSR
September- 16	67.11%
October- 16	62.40%
November- 16	66.99%
December- 16	65.09%
January- 17	65.09%
February- 17	60.60%
March- 17	51.69%
April- 17	68.31%
May- 17	59.82%
June- 17	57.57%
July- 17	51.30%
August- 17	61.83%
<b>2017 CY Avg.</b>	<b>61.48%</b>

Option Used to Meet Vector Attraction Reduction Requirements: calculation of the **Volatile Solids Reduction** percentage by using the **Van Kleeck Equation**

Volatile Solids Reduction (VSR) = anaerobic digestion will degrade most of the organic matter to less biodegradable forms.

#### Formulas

Mass of Volatile Solids (VS) = volume (gals) x % total solids (in decimal form) x % volatile solids (in decimal form) x 8.34 lbs/gal

Van Kleeck Equation:

$$\%VSR = \frac{VS_{\text{feed}} - VS_{\text{digested}}}{VS_{\text{feed}} - (VS_{\text{feed}} \times VS_{\text{digested}})} \times 100$$

VS = Volatile Solids (in decimal form)

*\*Note - Gallons Transferred should be the same as Digester Feed gallons due to no decant or grit accumulation.*

*\*\*Note - %TS & %TVS data for Digested Biosolids taken from metal analysis spreadsheet, to account for the additional degradation occurring in the storage digester.*

**Site Specific Information**

<b>SITE CODE</b> (each site follows column down):	F	I-J	B-1	
	Landowner:	City of St. Cloud	City of St. Cloud	Leroy and Lloyd Gohman
	Actual Acreage Receiving Biosolids:	10.1	39.5	26.6
	Crop Grown This Year:	Corn	Corn	Beans
	Realistic Yield Goal (yield/acre):	150	150	40
	Crop Grown Previous Year:	Corn	Corn	Corn
	Soil Organic Matter:	1.3	2.0	1.7
	MANA Rate (lbs/acre):	190	190	140
	Which Months/Year Applied:	Dec - 16	Apr - 17	Mar - 17
	Irrigated:	No	No	No

<b>SOIL TEST</b>	Date Sampled:	4.8.15	4.8.15	3.6.17
	Texture:	Coarse	Coarse	Coarse
	Organic Matter:	1.3	2.0	1.7
	Phosphorus:	491	344	468
	Potassium:	57	66	86
	pH:	6.9	6.9	6.5
	Soluble Salts:	0.1	0.3	0.1

<b>APPLICATION RATES &amp; METHODS</b>			
CY Sample # or average use in following calculations:	11	13	12
Date Sample Analyzed:	11.29.16	3.6.17	3.6.17
Gallons OR wet tons applied <u>per acre</u> this year:	3,000	8,557	6,006
<b>Total</b> gallons applied:	30,305	336,879	159,709
Dry tons applied <u>per acre</u> this year:	0.5	1.3	0.9
<b>Total</b> dry tons applied:	5.1	51.2	23.9
Method : Surface/Inject/Incorporated (0 to 48 hrs):	Inject	Inject	Inject
<b>Nitrogen Applied (In lbs/acre)</b>			
Available Nitrogen applied in biosolids this year:	138	183	128
Carry-over nitrogen from 1 year ago:	16	5	7
Carry-over nitrogen from 2 year ago:	NA	NA	NA
Nitrogen applied from other sources:	0	0	0
<b>Total</b> nitrogen applied:	154	188	135
N Stabilizer Used:	No	No	No

<b>Metals Applied (lbs/Ac)</b>	This Year	Cumulative	This Year	Cumulative	This Year	Cumulative
Arsenic	0.008	0.263	0.020	0.388	0.013	0.237
Cadmium	0.002	1.712	0.004	1.777	0.003	0.918
Copper	0.604	108.875	1.544	116.793	1.061	70.474
Lead	0.027	116.981	0.055	118.674	0.038	66.355
Mercury	0.001	0.186	0.002	0.535	0.001	0.008
Molybdenum	0.011	0.187	0.028	1.163	0.019	0.713
Nickel	0.037	0.768	0.084	16.099	0.058	10.533
Selenium	0.006	0.077	0.013	0.332	0.009	0.252
Zinc	0.704	9.607	1.807	214.083	1.240	126.540

**Site Specific Information**

<b>SITE CODE</b> (each site follows column down):	F-1	H-1		I-1		
	Landowner:	Leroy and LloydGohman		Doug Bischoff	ATS	
	Actual Acreage Receiving Biosolids:	47.0	30.0	16.2	8.4	
	Crop Grown This Year:	Corn	Beans	Beans	Corn	
	Realistic Yield Goal (yield/acre):	150	40	40	150	
	Crop Grown Previous Year:	Corn	Corn	Corn	Corn	
	Soil Organic Matter:	1.5	1.8	1.3	1.0	1.3
	MANA Rate (lbs/acre):	190	140	140	190	
	Which Months/Year Applied:	Apr - 17	Apr - 17	Apr - 17	Apr - 17	
	Irrigated:	No	No	No	No	

<b>SOIL TEST</b>	Date Sampled:	4.7.17		3.24.15	3.24.15	12.21.15
	Texture:	Coarse	Coarse	Coarse	Coarse	Coarse
	Organic Matter:	1.5	1.8	1.3	1.0	1.3
	Phosphorus:	460	322	123	145	361
	Potassium:	119	132	73	56	94
	pH:	6.5	7.1	6.1	6.0	6.7
	Soluble Salts:	0.1	0.1	0.1	0.1	0.1

<b>APPLICATION RATES &amp; METHODS</b>				
CY Sample # or average use in following calculations:	14	13	14	14
Date Sample Analyzed:	3.6.17	3.6.17	3.6.17	3.6.17
Gallons OR wet tons applied <u>per acre</u> this year:	7,589	6,079	5,470	7,395
<b>Total</b> gallons applied:	356,922	182,627	88,616	62,177
Dry tons applied <u>per acre</u> this year:	1.1	0.9	0.8	1.1
<b>Total</b> dry tons applied:	51.7	27.0	13.0	9.3
Method : Surface/Inject/Incorporated (0 to 48 hrs):	Inject	Inject	Inject	Inject
<b>Nitrogen Applied (In lbs/acre)</b>				
Available Nitrogen applied in biosolids this year:	175	130	129	170
Carry-over nitrogen from 1 year ago:	12	8	8	16
Carry-over nitrogen from 2 year ago:	NA	NA	NA	NA
Nitrogen applied from other sources:	0	0	0	0
<b>Total</b> nitrogen applied:	187	138	137	186
N Stabilizer Used:	No	No	No	No

<b>Metals Applied (lbs/Ac)</b>	This Year	Cumulative	This Year	Cumulative	This Year	Cumulative
Arsenic	0.017	0.348	0.014	0.199	0.016	0.200
Cadmium	0.004	0.061	0.003	0.279	0.004	0.084
Copper	1.344	31.238	1.103	18.699	1.302	19.962
Lead	0.048	2.609	0.040	13.916	0.047	1.328
Mercury	0.002	0.149	0.002	0.016	0.002	0.043
Molybdenum	0.025	0.726	0.020	0.175	0.024	0.452
Nickel	0.074	2.709	0.060	2.281	0.071	1.355
Selenium	0.011	0.299	0.009	0.077	0.011	0.168
Zinc	1.573	36.426	1.291	32.061	1.527	21.914



**Site Specific Information**

<b>SITE CODE</b> (each site follows column down):	AC-1	A-2	B-2		
	Landowner:	Leroy and Lloyd Gohman	Ron Schmidt	Ron Schmidt	
	Actual Acreage Receiving Biosolids:	31.2	4.2	8.6	17.7
	Crop Grown This Year:	Beans	Corn	Corn	Corn
	Realistic Yield Goal (yield/acre):	40	150	150	150
	Crop Grown Previous Year:	Corn	Corn	Hay	Hay
	Soil Organic Matter:	1.7	2.4	2.2	2.2
	MANA Rate (lbs/acre):	140	190	160	160
	Which Months/Year Applied:	Mar -Apr - 17	Apr - 17	Apr - 17	Apr - 17
	Irrigated:	No	No	No	No

<b>SOIL TEST</b>	Date Sampled:	3.24.15	3.6.17	9.28.15	
	Texture:	Coarse	Fine/Med	Fine/Med	
	Organic Matter:	1.7	2.4	2.2	
	Phosphorus:	333	271	356	
	Potassium:	63	83	65	
	pH:	7.2	7.2	7.1	
	Soluble Salts:	0.2	0.1	0.1	

<b>APPLICATION RATES &amp; METHODS</b>				
CY Sample # or average use in following calculations:	12	12	12	13
Date Sample Analyzed:	3.6.17	3.6.17	3.6.17	3.6.17
Gallons OR wet tons applied <u>per acre</u> this year:	5,963	8,584	7,376	7,341
<b>Total</b> gallons applied:	185,916	36,225	63,726	129,650
Dry tons applied <u>per acre</u> this year:	0.9	1.3	1.1	1.1
<b>Total</b> dry tons applied:	28.1	5.5	9.5	19.5
Method : Surface/Inject/Incorporated (0 to 48 hrs):	Inject	Inject	Inject	Inject
<b>Nitrogen Applied (In lbs/acre)</b>				
Available Nitrogen applied in biosolids this year:	127	183	157	157
Carry-over nitrogen from 1 year ago:	8	5	0	0
Carry-over nitrogen from 2 year ago:	NA	NA	NA	NA
Nitrogen applied from other sources:	0	0	0	0
<b>Total</b> nitrogen applied:	135	188	157	157
N Stabilizer Used:	No	No	No	No

<b>Metals Applied (lbs/Ac)</b>	This Year	Cumulative	This Year	Cumulative	This Year	Cumulative
Arsenic	0.013	0.262	0.019	0.092	0.017	0.164
Cadmium	0.003	0.944	0.004	0.565	0.004	0.838
Copper	1.053	75.256	1.516	40.394	1.343	64.413
Lead	0.038	70.306	0.054	49.107	0.048	66.568
Mercury	0.001	0.073	0.002	0.017	0.002	0.054
Molybdenum	0.019	0.873	0.028	0.230	0.025	1.625
Nickel	0.058	3.703	0.083	7.328	0.073	10.955
Selenium	0.009	0.269	0.013	0.087	0.011	0.196
Zinc	1.231	132.658	1.772	77.999	1.571	116.615

**Site Specific Information**

<b>SITE CODE</b> (each site follows column down):	C-2	D-2	F-2
	Landowner: Ron Schmdt	Ron Schmidt	Ron Schmidt
	Actual Acreage Receiving Biosolids: 25.2	10.4	16.0
	Crop Grown This Year: Corn	Corn	Corn
	Realistic Yield Goal (yield/acre): 150	150	150
	Crop Grown Previous Year: Corn	Corn	Corn
	Soil Organic Matter: 1.7	1.4	1.5
	MANA Rate (lbs/acre): 190	190	190
	Which Months/Year Applied: Apr - 17	Apr - 17	Mar - 17
	Irrigated: No	No	No

<b>SOIL TEST</b>	Date Sampled: 3.8.17	3.24.15	3.24.15
	Texture: Coarse	Coarse	Coarse
	Organic Matter: 1.7	1.4	1.5
	Phosphorus: 465	219	281
	Potassium: 92	61	48
	pH: 7.1	6.2	7.0
	Soluble Salts: 0.1	0.1	0.1

<b>APPLICATION RATES &amp; METHODS</b>			
CY Sample # or average use in following calculations:	13	12	12
Date Sample Analyzed:	3.6.17	3.6.17	3.6.17
Gallons OR wet tons applied <u>per acre</u> this year:	8,508	8,372	8,305
<b>Total</b> gallons applied:	214,401	87,408	134,037
Dry tons applied <u>per acre</u> this year:	1.3	1.2	1.2
<b>Total</b> dry tons applied:	32.8	12.5	19.4
Method : Surface/Inject/Incorporated (0 to 48 hrs):	Inject	Inject	Inject
<b>Nitrogen Applied (In lbs/acre)</b>			
Available Nitrogen applied in biosolids this year:	182	178	146
Carry-over nitrogen from 1 year ago:	6	9	9
Carry-over nitrogen from 2 year ago:	NA	NA	0
Nitrogen applied from other sources:	0	0	NA
<b>Total</b> nitrogen applied:	188	187	155
N Stabilizer Used:	No	No	No

<b>Metals Applied (lbs/Ac)</b>	This Year	Cumulative	This Year	Cumulative	This Year	Cumulative
Arsenic	0.020	0.274	0.019	0.169	0.019	0.174
Cadmium	0.004	4.689	0.004	0.810	0.004	0.828
Copper	1.544	70.562	1.478	55.580	1.466	51.967
Lead	0.055	63.816	0.053	62.845	0.053	49.784
Mercury	0.002	0.073	0.002	0.046	0.002	0.084
Molybdenum	0.028	0.658	0.027	0.093	0.027	1.630
Nickel	0.084	6.695	0.081	0.925	0.080	8.851
Selenium	0.013	0.259	0.012	0.145	0.012	0.206
Zinc	1.807	126.534	1.729	113.324	1.715	95.956

**Site Specific Information**

<b>SITE CODE</b> (each site follows column down):		H-2	I-2	A-5	
	Landowner:	Ron Schmidt	Ron Schmidt	Landwehr Construction	
	Actual Acreage Receiving Biosolids:	62.6	31.1	22.0	
	Crop Grown This Year:	Corn	Corn	Corn	
	Realistic Yield Goal (yield/acre):	150	150	150	
	Crop Grown Previous Year:	Corn	Corn	Corn	
	Soil Organic Matter:	1.9	3.5	1.9	1.2
	MANA Rate (lbs/acre):	190	190	190	
	Which Months/Year Applied:	Apr - 17	Apr - 17	Dec - 17	
	Irrigated:	No	No	No	

<b>SOIL TEST</b>	Date Sampled:	4.7.17	10.14.14	4.8.15	
	Texture:	Coarse	Fine/Med	Coarse	Coarse
	Organic Matter:	1.9	3.5	1.9	1.2
	Phosphorus:	262	201	269	410
	Potassium:	255	355	115	47
	pH:	6.0	6.2	6.2	6.3
	Soluble Salts:	0.1	0.2	0.1	0.1

<b>APPLICATION RATES &amp; METHODS</b>				
CY Sample # or average use in following calculations:	15	15	11	
Date Sample Analyzed:	3.14.17	3.14.17	11.29.16	
Gallons OR wet tons applied <u>per acre</u> this year:	7,341	7,283	8,272	
<b>Total</b> gallons applied:	459,626	226,136	182,307	
Dry tons applied <u>per acre</u> this year:	1.1	1.1	1.3	
<b>Total</b> dry tons applied:	68.9	35.2	28.7	
Method : Surface/Inject/Incorporated (0 to 48 hrs):	Inject	Inject	Inject	
<b>Nitrogen Applied (In lbs/acre)</b>				
Available Nitrogen applied in biosolids this year:	175	174	138	
Carry-over nitrogen from 1 year ago:	9	9	8	
Carry-over nitrogen from 2 year ago:	NA	NA	NA	
Nitrogen applied from other sources:	0	0	0	
<b>Total</b> nitrogen applied:	184	183	146	
N Stabilizer Used:	No	No	No	

<b>Metals Applied (lbs/Ac)</b>	<b>This Year</b>	<b>Cumulative</b>	<b>This Year</b>	<b>Cumulative</b>	<b>This Year</b>	<b>Cumulative</b>
Arsenic	0.014	0.122	0.014	0.201	0.021	0.107
Cadmium	0.004	0.038	0.004	0.098	0.005	0.189
Copper	1.469	6.512	1.457	17.025	1.651	65.582
Lead	0.038	1.830	0.038	1.275	0.074	40.057
Mercury	0.002	0.021	0.002	0.053	0.001	0.143
Molybdenum	0.020	0.169	0.019	0.415	0.029	1.119
Nickel	0.051	0.188	0.050	1.270	0.100	10.153
Selenium	0.010	0.144	0.010	0.330	0.016	0.321
Zinc	1.408	9.605	1.397	17.675	1.925	96.107

**Site Specific Information**

<b>SITE CODE</b> (each site follows column down):	BD-6	FJK-6	F-16			
	Landowner:	Kieth & Bob Klaverkamp	Keith & Bob Klaverkamp	Keith & Bob Klaverkamp		
	Actual Acreage Receiving Biosolids:	21.1	35.5	63.9	26.4	
	Crop Grown This Year:	Corn	Corn	Corn	Corn	
	Realistic Yield Goal (yield/acre):	200+	200+	200+	200+	
	Crop Grown Previous Year:	Beans	Beans	Corn	Corn	
	Soil Organic Matter:	1.2	4	2.9	2.2	2.2
	MANA Rate (lbs/acre):	190	190	230	230	
	Which Months/Year Applied:	Apr - 17	Oct-16	Oct-16	Oct-16	
	Irrigated:	Yes	Yes	Yes	Yes	

<b>SOIL TEST</b>	Date Sampled:	4.3.16	10.14.14	5.7.14		10.14.14
	Texture:	Coarse	Fine/Med	Fine/Med	Fine/Med	Fine/Med
	Organic Matter:	1.2	4.0	2.9	2.2	2.2
	Phosphorus:	233	37	111	130	86
	Potassium:	141	90	109	120	161
	pH:	6.7	6.8	6.6	6.2	6.2
	Soluble Salts:	0.1	0.2	0.1	0.1	0.1

<b>APPLICATION RATES &amp; METHODS</b>				
CY Sample # or average use in following calculations:	15	6	6	7
Date Sample Analyzed:	3.14.17	9.23.16	9.23.16	10.3.16
Gallons OR wet tons applied <u>per acre</u> this year:	7,589	9,567	9,892	10,012
<b>Total</b> gallons applied:	159,979	339,343	632,030	264,013
Dry tons applied <u>per acre</u> this year:	1.1	1.7	1.7	1.5
<b>Total</b> dry tons applied:	23.2	60.3	108.6	39.6
Method : Surface/Inject/Incorporated (0 to 48 hrs):	Inject	Inject	Inject	Inject
<b>Nitrogen Applied (In lbs/acre)</b>				
Available Nitrogen applied in biosolids this year:	159	184	191	215
Carry-over nitrogen from 1 year ago:	0	0	8	8
Carry-over nitrogen from 2 year ago:	NA	NA	NA	NA
Nitrogen applied from other sources:	0	0	0	0
<b>Total</b> nitrogen applied:	159	184	199	223
N Stabilizer Used:	No	Yes	Yes	Yes

<b>Metals Applied (lbs/Ac)</b>	This Year	Cumulative	This Year	Cumulative	This Year	Cumulative
Arsenic	0.014	0.152	0.038	0.270	0.039	0.271
Cadmium	0.004	0.405	0.005	0.698	0.006	0.699
Copper	1.519	35.762	1.912	56.510	1.977	56.575
Lead	0.039	29.096	0.074	53.862	0.077	53.815
Mercury	0.002	0.056	0.002	0.076	0.002	0.076
Molybdenum	0.020	0.515	0.040	0.628	0.042	0.600
Nickel	0.052	6.680	0.177	10.852	0.183	10.858
Selenium	0.011	0.148	0.019	0.429	0.020	0.430
Zinc	1.456	58.373	2.364	63.769	2.444	63.849

**Site Specific Information**

<b>SITE CODE</b> (each site follows column down):		ABC-17		B-20	D-20
	Landowner:	Larry Storms		Ray Moeller	Ray Moeller
	Actual Acreage Receiving Biosolids:	45.3	18.3	27.8	21.0
	Crop Grown This Year:	Corn	Corn	Corn	Corn
	Realistic Yield Goal (yield/acre):	200+	200+	150	150
	Crop Grown Previous Year:	Beans	Beans	Beans	Beans
	Soil Organic Matter:	1.4	2.0	1.4	1.7
	MANA Rate (lbs/acre):	190	190	150	150
	Which Months/Year Applied:	Oct-16	Oct-16	May - 17	May - 17
	Irrigated:	Yes	Yes	No	No

<b>SOIL TEST</b>	Date Sampled:	4.2.15		5.4.17	5.4.17
	Texture:	Coarse	Coarse	Coarse	Coarse
	Organic Matter:	1.4	2.0	1.5	1.7
	Phosphorus:	95	107	88	166
	Potassium:	77	72	85	122
	pH:	5.6	7.0	6.1	5.8
	Soluble Salts:	0.1	0.1	0.1	0.1

<b>APPLICATION RATES &amp; METHODS</b>				
CY Sample # or average use in following calculations:	5	7	18	18
Date Sample Analyzed:	9.20.16	10.3.16	4.27.17	4.27.17
Gallons OR wet tons applied <u>per acre</u> this year:	9,286	8,234	5,566	5,741
<b>Total</b> gallons applied:	420,198	150,932	154,903	120,800
Dry tons applied <u>per acre</u> this year:	1.7	1.2	0.9	1.0
<b>Total</b> dry tons applied:	76.9	22.0	25.0	21.0
Method : Surface/Inject/Incorporated (0 to 48 hrs):	Inject	Inject	Inject	Inject
<b>Nitrogen Applied (In lbs/acre)</b>				
Available Nitrogen applied in biosolids this year:	176	177	137	142
Carry-over nitrogen from 1 year ago:	7	7	6	6
Carry-over nitrogen from 2 year ago:	NA	NA	NA	NA
Nitrogen applied from other sources:	0	0	0	0
<b>Total</b> nitrogen applied:	183	184	143	148
N Stabilizer Used:	Yes	Yes	No	No

<b>Metals Applied (lbs/Ac)</b>	<b>This Year</b>	<b>Cumulative</b>	<b>This Year</b>	<b>Cumulative</b>	<b>This Year</b>	<b>Cumulative</b>
Arsenic	0.038	0.198	0.013	0.126	0.013	0.210
Cadmium	0.006	0.226	0.003	0.058	0.003	0.504
Copper	1.944	26.924	1.094	12.407	1.130	21.939
Lead	0.076	21.646	0.024	0.958	0.025	2.070
Mercury	0.002	0.012	0.002	0.021	0.002	0.045
Molybdenum	0.041	0.331	0.016	0.278	0.016	0.757
Nickel	0.180	1.580	0.072	0.752	0.075	0.771
Selenium	0.019	0.089	0.009	0.192	0.009	0.115
Zinc	2.404	39.314	1.152	12.822	1.190	23.724

**Site Specific Information**

<b>SITE CODE</b> (each site follows column down):	E-20	G-20		H-20		
	Landowner:	Ray Moeller	City of St. Cloud		City of St. Cloud	
	Actual Acreage Receiving Biosolids:	21.5	44.9		31.4	27.8
	Crop Grown This Year:	Corn	Corn		Corn	Corn
	Realistic Yield Goal (yield/acre):	150	150		150	150
	Crop Grown Previous Year:	Beans	Corn		Corn	Corn
	Soil Organic Matter:	1.6	1.4	1.8	2.7	1.6
	MANA Rate (lbs/acre):	150	190		190	190
	Which Months/Year Applied:	May - 17	May - 17		Apr - 17	May - 17
	Irrigated:	No	No		No	No

<b>SOIL TEST</b>	Date Sampled:	3.24.15	3.24.15		3.24.15	
	Texture:	Coarse	Coarse	Coarse	Fine/Med	Coarse
	Organic Matter:	1.6	1.7	1.8	2.7	1.6
	Phosphorus:	104	209	244	215	235
	Potassium:	76	65	71	68	60
	pH:	5.9	6.1	5.8	6.9	6.1
	Soluble Salts:	0.1	0.1	0.1	0.1	0.1

<b>APPLICATION RATES &amp; METHODS</b>					
CY Sample # or average use in following calculations:	18	17	16	17	
Date Sample Analyzed:	4.27.17	4.19.17	4.6.17	4.19.17	
Gallons OR wet tons applied <u>per acre</u> this year:	5,668	7,938	7,603	7,882	
<b>Total</b> gallons applied:	121,640	356,502	238,508	219,438	
Dry tons applied <u>per acre</u> this year:	1.0	1.2	1.2	1.2	
<b>Total</b> dry tons applied:	21.5	56.2	37.6	33.4	
Method : Surface/Inject/Incorporated (0 to 48 hrs):	Inject	Inject	Inject	Inject	
<b>Nitrogen Applied (In lbs/acre)</b>					
Available Nitrogen applied in biosolids this year:	140	185	186	184	
Carry-over nitrogen from 1 year ago:	6	0	0	0	
Carry-over nitrogen from 2 year ago:	NA	NA	NA	NA	
Nitrogen applied from other sources:	0	0	0	0	
<b>Total</b> nitrogen applied:	146	185	186	184	
N Stabilizer Used:	No	No	No	No	

<b>Metals Applied (lbs/Ac)</b>	This Year	Cumulative	This Year	Cumulative	This Year	Cumulative
Arsenic	0.013	0.268	0.016	0.258	0.017	0.179
Cadmium	0.003	0.092	0.004	0.091	0.004	0.123
Copper	1.138	15.039	1.415	13.424	1.497	17.976
Lead	0.025	1.894	0.031	1.910	0.044	10.887
Mercury	0.002	0.030	0.003	0.029	0.002	0.037
Molybdenum	0.017	0.165	0.021	0.148	0.021	0.735
Nickel	0.075	0.490	0.093	0.469	0.093	1.729
Selenium	0.009	0.075	0.012	0.067	0.012	0.250
Zinc	1.198	7.898	1.489	7.191	1.571	22.392

**Site Specific Information**

<b>SITE CODE</b> (each site follows column down):	AB-24	CD-24			
	Landowner:	Ken Massman		Ken Massman	
	Actual Acreage Receiving Biosolids:	53.3	24.4	13.2	19.2
	Crop Grown This Year:	Corn	Corn	Corn	Corn
	Realistic Yield Goal (yield/acre):	200+	200+	200+	150
	Crop Grown Previous Year:	Corn	Corn	Corn	Beans
	Soil Organic Matter:	2.9	3.0	2.8	2.9
	MANA Rate (lbs/acre):	230	230	230	150
	Which Months/Year Applied:	Oct-16	Oct-16	Oct-16	Oct-16
	Irrigated:	Yes	Yes	Yes	No

<b>SOIL TEST</b>	Date Sampled:	4.22.15		4.20.15	4.20.15
	Texture:	Fine/Med	Fine/Med	Fine/Med	Fine/Med
	Organic Matter:	2.9	3.0	2.8	2.9
	Phosphorus:	113	97	58	47
	Potassium:	96	113	143	101
	pH:	6.3	6.4	6.2	6.2
	Soluble Salts:	0.1	0.1	0.2	0.2

<b>APPLICATION RATES &amp; METHODS</b>				
CY Sample # or average use in following calculations:	1	1	2	2
Date Sample Analyzed:	9.7.16	9.7.16	9.9.16	9.9.16
Gallons OR wet tons applied <u>per acre</u> this year:	9,681	9,838	9,760	6,335
<b>Total</b> gallons applied:	516,371	239,657	128,344	121,763
Dry tons applied <u>per acre</u> this year:	1.5	1.4	1.5	1.0
<b>Total</b> dry tons applied:	80.0	34.1	19.7	19.2
Method : Surface/Inject/Incorporated (0 to 48 hrs):	Inject	Inject	Inject	Inject
<b>Nitrogen Applied (In lbs/acre)</b>				
Available Nitrogen applied in biosolids this year:	219	221	221	144
Carry-over nitrogen from 1 year ago:	6	6	6	6
Carry-over nitrogen from 2 year ago:	NA	NA	NA	NA
Nitrogen applied from other sources:	0	0	0	0
<b>Total</b> nitrogen applied:	225	227	227	150
N Stabilizer Used:	Yes	Yes	Yes	Yes

<b>Metals Applied (lbs/Ac)</b>	This Year	Cumulative	This Year	Cumulative
Arsenic	0.032	0.135	0.032	0.081
Cadmium	0.006	0.185	0.006	0.086
Copper	1.472	13.408	1.695	6.187
Lead	0.070	7.674	0.078	0.468
Mercury	0.003	0.024	0.005	0.013
Molybdenum	0.036	0.068	0.037	0.065
Nickel	0.209	2.336	0.210	0.609
Selenium	0.011	0.078	0.014	0.168
Zinc	1.579	18.815	1.667	6.868

**Site Specific Information**

<b>SITE CODE</b> (each site follows column down):	ABC-26	DEFG-26		A-27		
	Landowner:	Kevin Hurrle		Rob Brouwer		
	Actual Acreage Receiving Biosolids:	32.6	45.6	9.6	16.9	
	Crop Grown This Year:	Beans		Beans	Corn	
	Realistic Yield Goal (yield/acre):	70	70	70	150	
	Crop Grown Previous Year:	Corn		Corn	Beans	
	Soil Organic Matter:	2.3	2.4	2.6	2.2	1.8
	MANA Rate (lbs/acre):	245		245	245	150
	Which Months/Year Applied:	May - 17		May - 17	May - 17	Nov-16
	Irrigated:	Yes		Yes	Yes	No

<b>SOIL TEST</b>	Date Sampled:	11.10.15		4.17.15		4.9.15
	Texture:	Fine/Med	Fine/Med	Fine/Med	Fine/Med	Coarse
	Organic Matter:	2.3	2.4	2.6	2.2	1.8
	Phosphorus:	181	146	115	116	70
	Potassium:	171	146	211	162	89
	pH:	7.4	6.3	6.9	6.7	6.5
	Soluble Salts:	0.2	0.2	0.2	0.2	0.1

<b>APPLICATION RATES &amp; METHODS</b>				
CY Sample # or average use in following calculations:	20	19	20	8
Date Sample Analyzed:	5.18.17	5.4.17	5.18.17	10.20.16
Gallons OR wet tons applied <u>per acre</u> this year:	10,349	9,808	9,936	7,515
<b>Total</b> gallons applied:	336,120	447,263	95,283	126,927
Dry tons applied <u>per acre</u> this year:	1.7	1.6	1.7	1.2
<b>Total</b> dry tons applied:	55.2	73.0	16.3	20.3
Method : Surface/Inject/Incorporated (0 to 48 hrs):	Inject	Inject	Inject	Inject
<b>Nitrogen Applied (In lbs/acre)</b>				
Available Nitrogen applied in biosolids this year:	245	238	236	147
Carry-over nitrogen from 1 year ago:	0	0	0	0
Carry-over nitrogen from 2 year ago:	NA	NA	NA	NA
Nitrogen applied from other sources:	0	0	0	0
<b>Total</b> nitrogen applied:	245	238	236	147
N Stabilizer Used:	No	No	No	No

<b>Metals Applied (lbs/Ac)</b>	This Year	Cumulative	This Year	Cumulative	This Year	Cumulative
Arsenic	0.023	0.181	0.022	0.140	0.025	0.058
Cadmium	0.006	0.156	0.005	0.138	0.004	0.022
Copper	1.994	17.173	1.914	14.884	1.415	5.567
Lead	0.044	4.559	0.042	2.897	0.060	0.677
Mercury	0.004	0.048	0.004	0.030	0.003	0.008
Molybdenum	0.029	0.463	0.028	0.352	0.029	0.151
Nickel	0.132	1.943	0.127	1.248	0.095	0.444
Selenium	0.016	0.129	0.016	0.099	0.014	0.070
Zinc	2.099	22.491	2.015	18.948	1.623	6.042



**Site Specific Information**

<b>SITE CODE</b> (each site follows column down):		B-27		H-27		E-36	
	Landowner:	Rob Brouwer		Mike Heminger		Rich Janski	
	Actual Acreage Receiving Biosolids:	35.4	32.8	11.8	11.8	35.6	35.6
	Crop Grown This Year:	Corn	Corn	Corn	Corn	Corn	Corn
	Realistic Yield Goal (yield/acre):	150	150	150	150	200+	200+
	Crop Grown Previous Year:	Beans	Beans	Rye	Rye	Beans	Beans
	Soil Organic Matter:	2.0	2.0	2.2	2.2	2.3	2.8
	MANA Rate (lbs/acre):	150	150	190	190	190	190
	Which Months/Year Applied:	Oct-16	Nov-16	Nov-16	Nov-16	Oct-16	Oct-16
	Irrigated:	No	No	No	No	Yes	Yes

<b>SOIL TEST</b>	Date Sampled:	4.7.16	4.7.16	10.14.14	10.14.14	10.14.14
	Texture:	Coarse	Coarse	Fine/Med	Fine/Med	Fine/Med
	Organic Matter:	2.0	2.0	2.2	2.3	2.8
	Phosphorus:	98	77	134	141	120
	Potassium:	139	121	91	158	181
	pH:	5.7	5.9	6.3	7.4	7.6
	Soluble Salts:	0.1	0.1	0.1	0.1	0.2

<b>APPLICATION RATES &amp; METHODS</b>				
CY Sample # or average use in following calculations:	7	8	8	4
Date Sample Analyzed:	10.3.16	10.20.16	10.20.16	9.15.16
Gallons OR wet tons applied <u>per acre</u> this year:	6,895	7,521	9,450	8,339
<b>Total</b> gallons applied:	243,868	246,911	111,034	297,045
Dry tons applied <u>per acre</u> this year:	1.0	1.2	1.5	1.4
<b>Total</b> dry tons applied:	35.4	39.4	17.6	49.8
Method : Surface/Inject/Incorporated (0 to 48 hrs):	Inject	Inject	Inject	Inject
<b>Nitrogen Applied (In lbs/acre)</b>				
Available Nitrogen applied in biosolids this year:	148	147	184	185
Carry-over nitrogen from 1 year ago:	0	0	5	0
Carry-over nitrogen from 2 year ago:	NA	NA	NA	NA
Nitrogen applied from other sources:	0	0	0	0
<b>Total</b> nitrogen applied:	148	147	189	185
N Stabilizer Used:	Yes	Yes	No	Yes

<b>Metals Applied (lbs/Ac)</b>	<b>This Year</b>	<b>Cumulative</b>	<b>This Year</b>	<b>Cumulative</b>	<b>This Year</b>	<b>Cumulative</b>
Arsenic	0.025	0.146	0.032	0.176	0.019	0.073
Cadmium	0.004	0.113	0.005	0.128	0.005	0.036
Copper	1.416	12.128	1.779	15.779	1.389	6.918
Lead	0.060	5.428	0.076	3.714	0.075	0.760
Mercury	0.003	0.023	0.003	0.028	0.002	0.009
Molybdenum	0.029	0.269	0.037	0.325	0.036	0.232
Nickel	0.019	0.472	0.119	1.675	0.148	0.643
Selenium	0.014	0.076	0.018	0.120	0.013	0.087
Zinc	1.625	7.502	2.041	19.572	1.502	7.682

**Site Specific Information**

<b>SITE CODE</b> (each site follows column down):	K-36		A-44	A-47		
	Landowner:	Al Beumer		Gertrude Thole	Dan Dahnke	
	Actual Acreage Receiving Biosolids:	36.1	28.5	35.3	39.6	14.0
	Crop Grown This Year:	Corn	Corn	Corn	Corn	Corn
	Realistic Yield Goal (yield/acre):	200+	200+	150	200+	200+
	Crop Grown Previous Year:	Beans	Beans	Corn	Beans	Corn
	Soil Organic Matter:	2.3	2.9	1.1	2.4	2.3
	MANA Rate (lbs/acre):	190	190	190	190	230
	Which Months/Year Applied:	Oct-16	Oct-16	Apr - 17	Oct-16	Oct-16
	Irrigated:	Yes	Yes	No	Yes	Yes

<b>SOIL TEST</b>	Date Sampled:	4.3.16		4.8.15	10.11.14	
	Texture:	Fine/Med	Fine/Med	Coarse	Fine/Med	Fine/Med
	Organic Matter:	2.3	2.9	1.1	2.4	2.3
	Phosphorus:	22	45	223	107	85
	Potassium:	102	159	49	241	226
	pH:	7.9	8.0	7.3	7.0	6.4
	Soluble Salts:	0.1	0.1	0.1	0.1	0.1

<b>APPLICATION RATES &amp; METHODS</b>					
CY Sample # or average use in following calculations:	4	5	14	3	4
Date Sample Analyzed:	9.15.16	9.20.16	3.6.17	9.7.16	9.15.16
Gallons OR wet tons applied <u>per acre</u> this year:	8,419	9,913	7,797	7,745	9,837
<b>Total</b> gallons applied:	303,430	282,718	275,541	306,612	137,910
Dry tons applied <u>per acre</u> this year:	1.4	1.8	1.2	1.2	1.6
<b>Total</b> dry tons applied:	50.5	51.3	42.4	47.5	22.4
Method : Surface/Inject/Incorporated (0 to 48 hrs):	Inject	Inject	Inject	Inject	Inject
<b>Nitrogen Applied (In lbs/acre)</b>					
Available Nitrogen applied in biosolids this year:	187	188	184	179	219
Carry-over nitrogen from 1 year ago:	0	0	0	6	6
Carry-over nitrogen from 2 year ago:	NA	NA	NA	NA	NA
Nitrogen applied from other sources:	0	0	0	0	0
<b>Total</b> nitrogen applied:	187	188	184	185	225
N Stabilizer Used:	Yes	Yes	No	Yes	Yes

<b>Metals Applied (lbs/Ac)</b>	This Year	Cumulative	This Year	Cumulative	This Year	Cumulative
Arsenic	0.042	0.042	0.018	0.200	0.026	0.198
Cadmium	0.007	0.007	0.004	0.047	0.007	0.062
Copper	2.188	2.188	1.415	21.588	1.880	15.409
Lead	0.097	0.097	0.051	1.472	0.102	0.890
Mercury	0.003	0.003	0.002	0.049	0.009	0.030
Molybdenum	0.055	0.055	0.026	0.536	0.048	0.359
Nickel	0.202	0.202	0.077	2.467	0.200	2.062
Selenium	0.022	0.022	0.012	0.179	0.017	0.150
Zinc	2.493	2.493	1.656	22.824	2.032	14.700

**Site Specific Information**

SITE CODE (each site follows column down):	B-47			A-49		B-49
	Dan Dahnke			Byron Gerhke		Byron Gerhke
Landowner:						
Actual Acreage Receiving Biosolids:	13.8	51.1	12.0	29.1	36.4	16.7
Crop Grown This Year:	Corn	Corn	Corn	Corn	Corn	Corn
Realistic Yield Goal (yield/acre):	200+	200+	200+	200+	200+	200+
Crop Grown Previous Year:	Beans	Corn	Corn	Corn	Corn	Corn
Soil Organic Matter:	2.4	2.8	2.8	2.4	2.3	2
MANA Rate (lbs/acre):	190	230	230	230	230	230
Which Months/Year Applied:	Oct-16	Oct-16	Oct-16	Nov-16	Nov-16	Nov-16
Irrigated:	Yes	Yes	Yes	Yes	Yes	Yes

SOIL TEST	Date Sampled:	10.11.14	10.11.14	4.3.16		4.3.16
	Texture:	Fine/Med	Fine/Med	Fine/Med	Fine/Med	Coarse
Organic Matter:	2.4	2.8	2.4	2.3	2.0	
Phosphorus:	110	231	123	129	75	
Potassium:	258	272	109	92	83	
pH:	7.4	7.3	6.7	7.0	6.3	
Soluble Salts:	0.1	0.2	0.1	0.1	0.1	

APPLICATION RATES & METHODS						
CY Sample # or average use in following calculations:	3	3	4	9	10	9
Date Sample Analyzed:	9.7.16	9.7.16	9.15.16	10.27.16	11.14.16	10.27.16
Gallons OR wet tons applied <u>per acre</u> this year:	7,770	9,438	9,932	10,055	10,003	10,032
<b>Total</b> gallons applied:	107,298	482,205	119,380	292,413	363,996	167,633
Dry tons applied <u>per acre</u> this year:	1.2	1.4	1.6	1.6	1.6	1.6
<b>Total</b> dry tons applied:	16.6	71.5	30.8	46.5	58.2	26.7
Method : Surface/Inject/Incorporated (0 to 48 hrs):	Inject	Inject	Inject	Inject	Inject	Inject
Nitrogen Applied (In lbs/acre)						
Available Nitrogen applied in biosolids this year:	180	218	221	193	212	193
Carry-over nitrogen from 1 year ago:	6	6	6	0	0	0
Carry-over nitrogen from 2 year ago:	NA	NA	NA	NA	NA	NA
Nitrogen applied from other sources:	0	0	0	0	0	0
<b>Total</b> nitrogen applied:	186	224	227	193	212	193
N Stabilizer Used:	Yes	Yes	Yes	No	No	No

Metals Applied (lbs/Ac)	This Year	This Year	This Year	Cumulative	This Year	Cumulative
Arsenic	0.026	0.220	0.034	0.075	0.033	0.059
Cadmium	0.007	0.072	0.006	0.091	0.006	0.014
Copper	1.898	15.938	1.893	6.082	1.869	4.212
Lead	0.103	0.961	0.081	0.231	0.080	0.185
Mercury	0.009	0.034	0.003	0.027	0.003	0.005
Molybdenum	0.049	0.385	0.039	0.106	0.039	0.101
Nickel	0.202	2.116	0.126	0.350	0.125	0.236
Selenium	0.017	0.154	0.019	0.100	0.019	0.039
Zinc	2.015	15.717	2.172	6.624	2.144	4.553

**Site Specific Information**

<b>SITE CODE</b> (each site follows column down):	J-49	A-51		B-54		
	Landowner:	Dan Jacobs	Mark Dougherty		Dammann	
	Actual Acreage Receiving Biosolids:	33.7	15.2	24.1	52.3	
	Crop Grown This Year:	Corn	Corn	Corn	Corn	
	Realistic Yield Goal (yield/acre):	200+	200+	200+	200+	
	Crop Grown Previous Year:	Beans	Corn	Corn	Corn	
	Soil Organic Matter:	1.7	3.1	3.1	1.4	1.8
	MANA Rate (lbs/acre):	190	230	230	230	
	Which Months/Year Applied:	Apr - 17	Nov-16	Nov-16	Apr - 17	
	Irrigated:	Yes	Yes	Yes	No	

<b>SOIL TEST</b>	Date Sampled:	4.3.16	11.2.16	4.9.15	
	Texture:	Coarse	Fine/Med	Coarse	Coarse
	Organic Matter:	1.7	3.1	1.4	1.8
	Phosphorus:	53	32	77	83
	Potassium:	71	220	126	171
	pH:	6.0	5.6	7.2	7.3
	Soluble Salts:	0.1	0.2	0.1	0.1

<b>APPLICATION RATES &amp; METHODS</b>				
CY Sample # or average use in following calculations:	16	8	9	16
Date Sample Analyzed:	4.6.17	10.20.16	10.27.16	4.6.17
Gallons OR wet tons applied <u>per acre</u> this year:	7,416	10,004	10,081	8,743
<b>Total</b> gallons applied:	249,690	151,758	242,650	457,505
Dry tons applied <u>per acre</u> this year:	1.2	1.6	1.6	1.4
<b>Total</b> dry tons applied:	40.4	24.3	38.5	81.1
Method : Surface/Inject/Incorporated (0 to 48 hrs):	Inject	Inject	Inject	Inject
<b>Nitrogen Applied (In lbs/acre)</b>				
Available Nitrogen applied in biosolids this year:	182	195	194	214
Carry-over nitrogen from 1 year ago:	0	0	0	11
Carry-over nitrogen from 2 year ago:	NA	NA	NA	NA
Nitrogen applied from other sources:	0	0	0	0
<b>Total</b> nitrogen applied:	182	195	194	225
N Stabilizer Used:	No	No	No	No

<b>Metals Applied (lbs/Ac)</b>	This Year	Cumulative	This Year	Cumulative	This Year	Cumulative
Arsenic	0.017	0.048	0.034	0.052	0.020	0.058
Cadmium	0.004	0.009	0.006	0.010	0.005	0.015
Copper	1.461	4.604	1.884	3.394	1.722	5.287
Lead	0.043	0.174	0.080	0.157	0.051	0.153
Mercury	0.002	0.054	0.003	0.007	0.003	0.007
Molybdenum	0.020	0.083	0.039	0.068	0.024	0.062
Nickel	0.066	0.299	0.126	0.220	0.077	0.289
Selenium	0.012	0.037	0.019	0.029	0.014	0.047
Zinc	1.532	4.980	2.161	3.880	1.807	5.867