



Public Works

P. O. Box 1614, 21 Reeve St., Woodstock, Ontario N4S 7Y3
Phone: 519-539-9800 Fax: 519-421-4711
Website: www.oxfordcounty.ca

February 15, 2014

District Manager
Ministry of the Environment
London District Office
C/o
Mr. Tom Clubb
Drinking Water Programs Supervisor
Ministry of the Environment
3232 White Oak Road, 3rd Floor
London, ON N6E 1L8

Dear Sir:

RE: 2013 Biosolids Annual Report containing Reports on the Biosolids Land Application Program, the Stormwater Management Facility for the Biosolids Centralized Storage Facility (BCSF), and the Inspection of the BCSF

Attached is the monitoring report for 2013 for Oxford County's biosolids land application program from the BCSF (storage site for Woodstock, Tillsonburg, and Ingersoll WWTPs), and the Thamesford WWTP Liquid Storage Tank. Also included is a report on the Stormwater Management Facility and an inspection report for the BCSF.

I trust this report fulfills the intent of the annual reporting requirements of the Certificates of Approval now referred to as Environmental Compliance Approval (ECA) #'s A800939, 3816-76HRTS, 5950-7XQKXS, 9997-82RS5A, 6974-6FKKAY, 5936-8RKKNU, 0342-7WCKCJ, and 8633-76AHSG.

Yours truly,

A handwritten signature in black ink, appearing to read "Don Ford", is written over a faint, larger version of the same signature.

Don Ford, BA, CMM II, C. Tech.
Wastewater Supervisor, Oxford County

c.c. Mr. Shahab Shafai, M.Sc., P.Eng.
Manager of Environmental Services, Oxford County
Mr. Mark Maxwell, P.Eng.
Project Engineer, Oxford County

Overview of the Biosolids Land Application Program

Oxford County owns and operates nine wastewater treatment plants within the County: namely, Woodstock Wastewater Treatment Plant (WWTP), Ingersoll WWTP, Tillsonburg WWTP, Thamesford WWTP, Drumbo Sequencing Batch Reactor (SBR), Norwich Lagoons, Plattsville Lagoons, Tavistock Lagoons, and Mount Elgin recirculating sand filter (RSF). The four larger mechanical plants generate biosolids on a daily basis while the other systems inventory the material within their treatment systems over long periods of time, or in the case of Drumbo SBR, have it transported to another facility (Woodstock) on a weekly basis for treatment.

Of the four larger mechanical plants, two plants digest material anaerobically (Woodstock and Ingersoll) and two digest biosolids aerobically (Thamesford and Tillsonburg). Woodstock WWTP produces roughly half of all the biosolids produced in the County excluding lagoons and traditionally had landfilled this material while the other plants traditionally used a combination of some land application and some landfilling of the material. This changed recently with the implementation of the Biosolids Management Master Plan (BMMP) with dewatering at three of the four larger mechanical plants and biosolids taken for storage at the Biosolids Centralized Storage Facility (BCSF) for application to land as a nutrient source.

Oxford County's Biosolids program was the winner of the 2008 Biosolids Award from the Water Environment Association of Ontario (WEAO) for small producers. There are five main elements of the Biosolids Management Master Plan which include: more enforcement of the Oxford County Sewer use by-law, dewatering of stabilized biosolids at each of the major wastewater treatment plants, transporting thickened sludge from smaller plants to the nearest major wastewater treatment plant for processing, land application of all biosolids on farms having a non-agricultural source material (NASM) plan, and centralized storage of biosolids when the material cannot be land applied.

The enforcement of the Oxford County sewer use bylaw was an important step, and to this end, Oxford County hired two enforcement personnel, one staff member in 2006 and a second in 2009. Also the wastewater division acquired additional sophisticated automatic sampling equipment. These changes were made with the goal of improving the quality and reducing the quantity of biosolids produced.

Ingersoll WWTP produced dewatered biosolids this year as the dewatering upgrade was completed in March of 2013, therefore only a small amount of material had to be trucked to the Woodstock Wastewater Treatment Plant in 2013.

Oxford County contracted the removal and land application of biosolids from Tavistock WWTP cell 2 which began in the fall of 2013 and will continue into 2014.

The Biosolids from all facilities were compliant with the Nutrient Management Act (NMA) regulations governing NASM.

Sampling Description

A sample is collected from each bin that leaves the wastewater treatment plants and composited over a two week period. This is then sent out for analysis of eleven metals, nutrients and E.Coli. The frequency would be consistent with the minimum required frequency for small generators per the NMA.

As a small generator, our sampling program will ensure collection of two samples within 30 days of land application and two additional samples within 90 days for nutrients. This can be accomplished by monthly sampling of the biosolids and additional sampling during biosolids removal.

The samples are analyzed by SGS Lakefield Research Ltd., a CAEAL certified lab. The results are entered into an excel spreadsheet and checked for compliance with the regulations at the time of being entered. The analytical results of the dewatered biosolids are also summarized on an annual spreadsheet to calculate monthly and yearly averages.

Biosolids analysis is provided to the contractor and farmer for their use at the time of land application by directly providing the sample analysis results to the biosolids contracted land applier in PDF format when received electronically from the external lab.

Discussion of Results

Table 1 highlights the analytical results for metals versus the NMA maximum criteria. All sources were compliant and were acceptable to be used as a nutrient for the land application program. More information can be found in Exhibit 1 for analytical results for different sources of biosolids.

The biosolids were resampled at the farm at the time of application and those results (2013) may be found in Exhibit 2. These samples provide a further check on the quality of the material and all 2013 samples complied with the NMA criteria as well.

The Biosolids contractor provides Nutrient reports to individual farmers on each application to aid in the beneficial use of the product as a nutrient. The contractor's table of NASM plans indicating spreading applications is included in Exhibit 3.

In summary, Oxford County's Biosolids Management program provided effective production, transport, storage, and eventual reuse as a nutrient via land application of all biosolids generated under the program. All operation and maintenance activities were performed by Oxford County staff in the wastewater treatment plants. The transportation of the biosolids from the facilities to the storage building was done through a contractor working on Oxford County's behalf. There were no notable upsets or spills during the year of operation and no complaints have been received to date.

Comparison of Generated Biosolids to NMA Criteria for Metals in mg/kg Dry Solids

Table 1

Parameter	Woodstock WWTP	Ingersoll WWTP	Tillsonburg WWTP	Thamesford WWTP	Tavistock WWTP	NMA Metals Criteria
Metals mg/kg dry solids	2013 Annual Average	2013 Annual Average	2013 Annual Average	2013 Annual Average	2013 Annual Average	Maximum
Arsenic	5.7	4.6	3.0	12	3.1	170
Cadmium	0.66	0.66	0.5	1.24	0.21	34
Cobalt	5	5	4.0	2.30	6	340
Chromium	66	49	25	26	24	2800
Copper	694	627	633	269	31	1700
Mercury	1.0	0.4	0.89	0.18	0.2	11
Molybdenum	11	20	7	7	9	94
Nickel	91	38	40	16	11	420
Lead	39	22	25	8	11	1100
Selenium	4	5	4	10	3	34
Zinc	999	1663	746	413	74	4200

Biosolids Centralized Storage Facility (BCSF) Operation

The Biosolids Centralized Storage Facility (BCSF) was built for the storage of the dewatered biosolids for periods such as winter months when the dewatered product cannot be directly land applied. The storage building is designed to provide a minimum of 240 days storage. It is also designed with segregated storage bays so that should material be determined to be non-compliant, it can be removed and taken to landfill and not mixed with compliant biosolids destined for land application. Please see in Table 2 below the 2013 biosolids production rate, type, and destination.

The BCSF is located near Salford, Ontario adjacent to the Oxford County Landfill and behind the compost area. This location was selected after public consultation through a Class Environmental Assessment process and involvement of the local landfill liaison committee. It is operated in such a way as to minimize the impact to neighbours as all the loading and unloading activities take place inside the building. The location is far enough back and surrounded by Oxford County buffer lands as to prevent any nuisance dust or noise from impacting neighbours. Trees have also been planted to help with the visual impact of the large building.

The building has sufficient room to house 7,000 m³ of material and would be built in two phases. The existing phase includes 12 bays; and a future phase 2 would add an

additional four bays. The facility has sufficient space to accommodate the 240-day storage requirements for the plants, although not all systems will dewater and store at first. Thamesford WWTP will stay with a liquid land application program for the time being and phased in to dewatering in future. The individual bays are slightly inclined with cement walls to allow for easy piling of the material. The incoming material is segregated by system and month and is deposited in the appropriate bay, after which Oxford County staff push the biosolids into higher piles at the back of the bay using the existing loader. There are large passive ventilation panels in the walls to allow for good ventilation and light into the building. The building is not connected to hydro. While there are lights, they would be powered by a portable generator only if needed during times of biosolids removal. The daily transport of the material into the storage facility is done during daylight hours.

Biosolids Production Rate, Type and Destination in 2013

Table 2

FACILITY	2013 Biosolids Land Applied	2013 Biosolids Stored	2013 Raw Sludge Hauled Between Plants	Total Biosolids Generated 2013	Biosolids Type	2013 Destination
Woodstock WWTP	2,353 wet tonnes/ 596 dry tonnes	1352 wet tonnes/ 342 dry tonnes		3705 wet tonnes 938 dry tonnes	Anaerobic dewatered	Storage Facility & Land Application
Ingersoll WWTP	521 wet tonnes/ 109 dry tonnes	532 wet tonnes/ 111 dry tonnes	1,151 m ³	1053 wet tonnes 220 dry tonnes	Co- thickened Primary Sludge & Anaerobic dewatered	Woodstock WWTP & Storage Facility
Tillsonburg WWTP	931 wet tonnes/ 230 dry tonnes	189 wet tonnes 47 dry tonnes		1120 wet tonnes 277 dry tonnes	Aerobic dewatered	Storage facility & Land Application
Thamesford WWTP	5,278 m ³	1,000 m ³		6,278 m ³	Aerobic liquid	Land Application
Drumbo SBR		–	1,942 m ³	n/a	Co- thickened Primary Sludge	Woodstock WWTP
Tavistock WWTP	1,888 dry tonnes	–			Lagoon Cleanout	Land Application

Overview of the Stormwater Management Facility for the Biosolids Centralized Storage Facility (BCSF)

The stormwater management facility services a total drainage area of 4.85 ha consisting of leaf and yard waste composting pad and a biosolids centralized storage facility (BCSF) located east of the Oxford County Landfill site. It was designed to attenuate stormwater runoff from storm events.

Description and Specifications

The facility consists of approximately a 132 m long 300 mm diameter solid pipe running from the compost pad to the forebay; an approximately 50 m long 200 mm diameter storm sewer collecting stormwater from areas located east and north of the BCSF to the forebay; and approximately 300 m long perimeter ditches collecting stormwater runoff from the BCSF building and from the south and west side of the structure discharging through a 300 mm diameter CSP culvert to the forebay. It also includes one 18 m long 1 m deep forebay, complete with rip rap, two inlet structures and one concrete weir outlet structure discharging to a wet detention pond. The wet detention stormwater pond with top dimensions of 78 m long by 38 m wide provides a permanent storage capacity of 1,564 m³ with a depth of 0.9 m. The pond is equipped with an outlet structure consisting of one 1,200 mm diameter precast concrete manhole, one 75 mm diameter orifice plate and approximately 13 m long outlet sewer discharging to Hooper Drain.

Sampling Procedure

Samples are collected semi-annually during spring and fall after a significant rainfall event and analyzed for the following:

Alkalinity
Total Ammonia Nitrogen
Chloride
Iron
Nitrate Nitrogen
Nitrite Nitrogen
TKN
Total Phosphorus
Total Suspended Solids
Sulphate
CBOD
COD
Phenol
pH
Temperature
Conductivity
Dissolved Oxygen

Stormwater Management Facility Performance & Effluent

The facility is inspected regularly and a log book of the inspections is maintained at the BCSF. The results of the sampling program are included in Exhibit 4 in a summary Table.

Spills, Upset and Abnormal Conditions

There were no spills or abnormal discharge events in 2013.

Inspection of the BCSF

The Biosolids Centralized Storage Facility was cleaned and an in-house inspection took place on September 24th, 2013.

Landfill staff swept the building prior to inspection and a vacuum truck was used to pump out the sump pits.

The following is a list of items found during inspection and the actions taken.

Inspection Item	Action Taken
<ul style="list-style-type: none">• There are cracks in the concrete floor at the aisle end of the concrete divider wall of Bays 1, 3, 4, 5, 6, 7, 8, 9, 10, 11&12.	No action required at this time, minor cracks.
<ul style="list-style-type: none">• In the centre aisle east of Bay 5 there is a piece of concrete reinforcing steel exposed.	No action required at this time.
<ul style="list-style-type: none">• In Bay 12 on the south side near the west end, there are two places in the floor that are broken.	No action required at this time.
<ul style="list-style-type: none">• There are minor cracks in the exterior walls on all sides of the building, some have minor staining, but none of them have opened up.	There is no action required.

Summary

The stormwater management facility provided effective attenuation of stormwater in 2013 with no adverse or abnormal conditions occurring.

The BCSF provided winter storage for the Oxford County biosolids land application program and was in excellent overall condition. No complaints were received about the operation of either facility in 2013.

EXHIBIT 1

Ingersoll WWTP De-Water Sludge 2013

Lab Number	CA12162-MAR13	CA12450-MAR13	CA13114-APR13	CA12612-APR13	CA13130-MAY13	CA13780-MAY13	CA13164-JUN13	CA13563-JUN13	CA12106-JUL13	CA13523-JUL13	CA12058-AUG13	CA12432-AUG13	CA13767-AUG13	CA13327-SEP13	CA12834-SEP13	CA14343-OCT13	CA13615-OCT13	CA13201-NOV13	CA13622-NOV13	CA12122-DEC13	CA15290-DEC13				
Sample Date	6-Mar-13	20-Mar-13	3-Apr-13	17-Apr-13	1-May-13	22-May-03	5-Jun-13	19-Jun-13	3-Jul-13	17-Jul-13	31-Jul-13	14-Aug-13	28-Aug-03	11-Sep-13	25-Sep-13	9-Oct-13	22-Oct-13	6-Nov-13	20-Nov-13	4-Dec-13	18-Dec-13				
Specific Gravity	1.1	1	1	1	1	1.0	1.1	1.0	1.1	1.0	1.1	1.1	1.0	1.1	1.0	1.1	1.0	1.0	1.0	1.0	1.0	1.0	Average	1.0	
Oil & Grease (total)	30000	38000	31000	27000	23000	26000	39000	45000	46000	39000	44000	39000	27000	40000	34000	35000	29000	47000	22000	29000	35000	36000		36000	
pH	7.65	7.74	8.09	7.91	7.99	7.61	7.84	8.23	8.19	7.89	7.88	7.36	6.63	7.12	7.13	7.22	7.28	7.12	6.75	7.49	7.63	7.46		7.46	
Alkalinity (mg/L as CaCO3)	1260	750	4340	4740	4950	3580	5750	5250	5960	4480	6310	1720	1650	2020	840	1090	3210	2510	2750	3970	3480	3398		3398	
Total Solids	18.3	19.5	20.3	18.5	18.6	20.0	21.2	22.2	20.8	21.1	21.3	21.8	22.0	21.7	21.7	22.4	21.2	21.1	20.4	21.0	21.0	21		21	
Volatile Solids	12	12.7	13.4	12.2	12	13.2	14.2	14.7	13.7	13.9	14.0	14.4	15.0	14.5	14.5	14.5	12.8	13.7	13.3	13.8	14	14		14	
Total Nitrogen-kjeldahl (N)	8900	7800	9200	7900	8800	10000	13000	12000	11000	11000	12000	11000	11000	11000	11000	12000	6800	12000	11000	11000	11000	11000		11050	
Ammonia+Ammonium (N)	1200	100	1400	1800	1200	1700	1200	1300	1500	1200	1100	1400	600	1300	1100	1200	1200	800	1100	1300	1200	1200		1200	
Nitrite as N	0.5	1.2	1.9	3	0.2	0.5	1.1	3.5	1.4	0.2	1.2	0.6	106.0	0.8	1.1	0.2	0.2	0.2	0.2	0.2	1	7		7	
Nitrate as N	0.3	0.5	0.3	0.3	0.3	95	0.3	0.3	0.3	0.3	0.3	0.3	73	0.3	0	0.3	0.3	0.3	0.3	0.3	0	11		11	
Nitrite+Nitrate as N	0.5	1.7	1.9	3	0.3	0.5	96.0	3.5	1.4	0.3	1.2	0.6	180.0	0.8	1	0.3	0.3	0.3	0.3	0.3	1	18		18	
As Arsenic	6.3	6.1	2	4	6.3	3.0	4.0	6.4	8	3.0	6.2	6	5.7	3	4	4.5	4.0	2	6.0	3.0	5.0	4.6		4.6	
B Boron	27	27	47	54	47	38	43	44	49	53	42	40	46	37	26	33	36	43	41	38	36	40		40	
Ca Calcium	40000	38000	37000	37000	36000	37000	37000	38000	37000	40000	35000	34000	35000	35000	30000	33000	34000	34000	35000	35000	35000	35000		35250	
Cd Cadmium	0.55	0.3	0.2	0.48	0.3	1	0.4	0.2	0.24	0.20	0.33	0.42	0.2	2.00	1.20	1.10	0.93	0.72	0.74	0.20	1.2	0.7		0.7	
Co Cobalt	6	5	5	5	5	5	4	5	5	5	5	4.0	5	5	4	5	5	5	5	5	5	5		5	
Cr Chromium	47	46	43	39	40	42	50	62	66	68	61	54	58	50	41	38	41	37	41	38	41	49		49	
Cu Copper	760	700	620	600	530	540	550	600	600	700	660	670	620	700	600	640	670	640	630	610	600	627		627	
Hg Mercury	0.33	0.6	0.5	0.3	0.4	0.3	0.2	0.3	0.3	0.2	0.40	0.4	0.30	0.3	0.6	0.6	0.4	0.5	0.3	0.7	0.6	0.4		0.4	
K Potassium	1000	13	1200	1100	1100	1000	1000	880	860	900	880	910	870	870	740	870	960	970	1000	960	1000	920		920	
Mg Magnesium	4800	4800	4800	4900	4700	4600	4500	4500	4600	4700	4500	4300	4400	4300	3700	4400	4500	4500	4800	4600	4400	4450		4450	
Mo Molybdenum	13	13	12	13	11	14	18	19	21	22	20	21	21	21	20	21	23	21	20	14	18	20		20	
Na Sodium	1500	1400	1400	1600	1400	1300	1300	1400	1400	1400	1400	1400	1800	1300	1200	1200	1200	1300	1400	1400	1200	1200	1319		1319
Ni Nickel	38	37	33	30	28	39	31	43	43	45	44	43	43	31	37	36	31	36	34	34	33	38		38	
P Phosphorus	36000	35000	35000	34000	35000	35000	33000	34000	34000	38000	34000	35000	32000	35000	29000	31000	33000	34000	34000	34000	32000	33663		33663	
Pb Lead	22	26	20	17	14	16	17	18	19	24	23	26	23	31	26	22	22	21	23	21	22	22		22	
Se Selenium	6	5	5	5	5	5	5	4	8	5	5	5	4	8	5	4	5	5	5	5	5	5		5	
Zn Zinc	1600	1600	1300	1200	1100	1100	1300	1600	1800	2400	2200	2100	1800	1900	1500	1500	1500	1500	1400	1500	1500	1663		1663	
E Coli (cfu/1gm dried wgt)	12015	16436	12327	30221	9698	120180	43294	90171	172828	42100	10314	9065934	236579	4053432	1302947	406977	395667	213169	41136	57957	12808	168394		168394	
All results less than MDL taken as MDL																								2,000,000	
Results Compared to Criteria																							Average	Criteria	
As Arsenic	6.3	6.1	2.0	4.0	6.3	3.0	4.0	6.4	7.6	3.0	6.2	6.1	5.7	3.4	3.9	4.5	4.0	2.4	6.0	3.0	5.0	4.6		170	
Cd Cadmium	0.55	0.3	0.2	0.48	0.3	0.5	0.42	0.23	0.24	0.2	0.33	0.42	0.2	2	1.2	1.1	0.93	0.72	0.74	0.2	1.2	0.66		34	
Co Cobalt	6.0	5.0	5.0	5.0	5.0	5.0	5.0	4.0	5.0	5.0	5.0	5.0	4.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5		340	
Cr Chromium	47	46	43	39	40	42	50	62	66	68	61	54	58	50	41	38	41	37	41	38	41	49		2800	
Cu Copper	760	700	620	600	530	540	550	600	600	700	660	670	620	700	600	640	670	640	630	610	600	627		1700	
Hg Mercury	0.3	0.6	0.5	0.3	0.4	0.3	0.2	0.3	0.3	0.2	0.4	0.4	0.3	0.3	0.6	0.6	0.4	0.5	0.3	0.7	0.6	0.4		11	
Mo Molybdenum	13	13	12	13	11	14	18	19	21	22	20	21	21	21	20	21	23	21	20	14	18	20		94	
Ni Nickel	38	37	33	30	28	39	31	43	43	45	44	43	43	31	37	36	31	36	34	34	33	38		420	
Pb Lead	22	26	20	17	14	16	17	18	19	24	23	26	23	31	26	22	22	21	23	21	22	22		1100	
Se Selenium	6	5	5	5	5	5	5	4	8	5	5	5	4	8	5	4	5	5	5	5	5	5		34	
Zn Zinc	1600	1600	1300	1200	1100	1100	1300	1600	1800	2400	2200	2100	1800	1900	1500	1500	1500	1500	1400	1500	1500	1663		4200	

Tillsonburg WWTP De-Water Sludge September 2013

Lab Number	CA12051-JAN13	CA13351-JAN13	CA13101-FEB13	CA13405-FEB13	CA13562-MAR13	CA12474-MAR13	CA13118-APR13	CA12813-APR13	CA12091-MAY13	CA12091-MAY13	CA13572-MAY13	CA13151-JUN13	CA13587-JUN13	CA13339-JUL13	CA13514-JUL13	CA12189-AUG13	CA13569-AUG13	CA12094-SEP13	CA13487-SEP13	CA12106-OCT13	CA13501-OCT13	CA12160-NOV13	CA12543-NOV13	CA13169-DEC13	CA13549-DEC13			
Sample Date	2-Jan-13	16-Jan-13	6-Feb-13	20-Feb-13	6-Mar-13	20-Mar-13	3-Apr-13	17-Apr-13	1-May-13	1-May-13	15-May-13	5-Jun-13	19-Jun-13	10-Jul-13	17-Jul-13	7-Aug-13	21-Aug-03	4-Sep-13	18-Sep-13	2-Oct-13	16-Oct-13	6-Nov-13	20-Nov-13	4-Dec-13	18-Dec-13			
Specific Gravity	1.0	1.0	1.0	1.0	1.1	1.0	1.0	1.0	1.0	1.0	1.1	1.1	1.0	1.1	1.0	1.1	1.0	1.0	1.0	1.0	1.0	1.1	1.0	1.0	1.0		Average	
Oil & Grease (total)	2200	6000	3800	3500	2900	7400	7200	4200	4500	4500	6600	7200	8200	11000	4900	7400	9300	5100	3100	3400	1300.00	1100	2600	3500	3200		1.0	
pH	units	6.46	6.18	6.44	6.72	6.27	6.59	6.44	6.68	6.78	6.27	6.06	6.25	6.59	6.22	5.99	5.23	6.30	5.43	6	5.86	7.38	5.99	6.51	6.32		4964	
Alkalinity (mg/L as CaCO3)		200	540	1300	350	160	1490	2770	510	830	890	1390	1000	520	67	1080	550	67	870	65	590	1380	330	710	720		704	
Total Solids	mg/L	22.0	22.9	29.6	21.9	27.7	31.4	26.3	21.2	30.1	24.6	26.6	22.6	22.7	24.4	23.2	22.1	24.4	23.8	21.6	21	22.5	22.3	22.7	24.7		24	
Volatile Solids	mg/L	13.0	15.9	20.7	15.4	19.4	18.4	14.6	20.2	18.0	16.2	18.0	22.6	16.0	14.9	16.0	15.6	15.6	16.0	14.6	14	15.1	15.7	15.8	17.1		17	
Total Nitrogen-kjeldahl (N)	mg/L	13000	11000	14000	12000	6800	9200	16000	6200	14000	14000	10000	5600	12000	900	6300	10000	8100	8400	8000.0	8300	11000	8000	11000	11000		9916	
AmmoniacalAmmonium (N)	mg/L	200	100	200	100	300	200	200	100	140	100	100	100	100	100	100	100	100	100	100.0	200	200	300	200	200		166	
Nitrite as N	mg/L	110	44	59	69	130	67	37	63	64	64	79	150	56	54	45	22	58	18	4	57	92	120	110.0			69	
Nitrate as N	mg/L	95	288	220	86	260	140	114	140	40	130	460	360	280	100	240	247	380	170	440	330	410	150	320	240		227	
Nitrite+Nitrate as N	mg/L	210	332	280	155	390	210	151	223	100	100	210	410	370	160	290	292	400	230	460	330	470	242	440	350.0		297	
As Arsenic	mg/kg	3.0	5.0	3.0	2.5	4.3	2.8	2.0	2.0	3.5	3.5	2.0	2.0	3.1	2.0	3.2	6.5	5.2	2.0	3.5	4.0	2.0	2.0	2.6	3.0		3.0	
B Boron	mg/kg	34	27	25	170	16	26	16	21	22	22	14	30	35	31	31	37	32	29	19	25	23.00	33	17	21		31	
Ca Calcium	mg/kg	25000	27000	30000	31000	31000	23000	27000	28000	28000	30000	30000	28000	28000	27000	31000	31000	22000	28000	27000	26000	31000	27000	30000	29000		28120	
Cd Cadmium	mg/kg	0.60	0.52	0.47	0.51	0.50	0.20	0.27	0.40	0.20	0.33	0.41	0.53	0.84	0.20	0.53	0.66	0.82	0.20	0.98	0.67	0.71	0.6	0.48	0.53		0.49	
Co Cobalt	mg/kg	4	4	3	5	4	3	<4	5	3	4	4	4	4	4	4	4	4	4	5	4	4	4	4	3		4.0	
Cr Chromium	mg/kg	27	32	26	22	26	21	27	26	25	25	22	25	21	24	27	26	21	27	23.0	29	25	29	28	25		25	
Cu Copper	mg/kg	630	700	620	600	670	510	590	570	570	540	560	560	590	570	640	590	690	690	740	680	840	700	750	650		633	
Hg Mercury	mg/kg	0.8	1.0	1.1	0.6	1.0	0.6	0.6	0.5	0.6	0.6	0.4	3.1	0.8	0.4	0.6	0.50	0.40	1.2	1.000	1.1	0.5	1.0	0.5	0.9		0.9	
K Potassium	mg/kg	3200	3400	3800	3500	3600	2900	3200	3400	3100	3100	2800	2800	2100	2200	1900	2200	2100	2100	2300	2200	2300	2400	2400	2700		2700	
Mg Magnesium	mg/kg	2900	3200	3700	4000	3700	2900	3500	3600	3500	3600	3600	3400	3300	3200	3600	3300	2500	3000	2800	2800	3100	2800	3100	3200		3280	
Mo Molybdenum	mg/kg	3.0	5.1	5.6	5.5	5.1	3.7	4.6	7.4	5.4	5.4	4.0	8.9	4.0	5.4	7	6.5	8.7	6.8	12.0	11.0	9.0	8.3	6		6.6		
Na Sodium	mg/kg	1600	1700	1700	1600	1700	1400	1500	1500	1400	1400	1300	1300	1300	1300	1500	1700	1400	1600	1700	2000	1800	1800	1800	1800		1568	
Ni Nickel	mg/kg	43	45	38	32	36	26	29	29	29	26	27	27	32	30	38	42	47	49	56	54.0	64	56	64	56		40	
P Phosphorus	mg/kg	37000	41000	38000	37000	42000	33000	40000	40000	40000	38000	39000	39000	39000	37000	41000	36000	43000	41000	46000	42000	53000	42000	46000	39000		40360	
Pb Lead	mg/kg	27	23	20	22	23	20	19	19	20	21	20	21	24	22	32	30	28.0	26	26	33	30	27	33	36		25	
Se Selenium	mg/kg	4	4	3	5	4	3	4	3	4	4	4	4	4	4	4	4	4	<4	5	4	4	4	4	4		4.0	
Zn Zinc	mg/kg	730	800	720	690	740	580	630	640	600	620	640	680	690	780	850	900	960	880	1000	840	910	780	746			746	
E Coli (cfu/1gm dried wgt)		181984	3454	7104	195989	21269	133545	32295	94429	15267	15267	4192	120120	128092	35746	65611	14754	15928	29437	121849	161738	32319	36911	809503	17785		41032	
All results less than MDL taken as MDL																												
Results Compared to Criteria																												
As Arsenic	mg/kg	3.0	5.0	3.0	2.5	4.3	2.8	2.0	2.0	3.5	3.5	2.0	2.0	3.1	2.0	3.0	6.5	5.2	2.0	3.5	4.0	2.0	2.0	2.6	3.0		Average	Criteria
Cd Cadmium	mg/kg	0.60	0.52	0.47	0.51	0.50	0.20	0.27	0.40	0.20	0.33	0.41	0.53	0.84	0.20	0.53	0.66	0.82	0.20	0.98	0.67	0.71	0.69	0.48	0.53		0.5	34
Co Cobalt	mg/kg	4	4	3	5	4	3	<4	5	3	4	4	4	4	4	4	4	4	4	5	4	4	4	3	4		4.0	340
Cr Chromium	mg/kg	27	32	26	22	26	21	27	26	25	25	22	25	21	24	27	26	21	27	23	29	25	29	28	25		25	2800
Cu Copper	mg/kg	630	700	620	600	670	510	590	570	570	540	560	560	590	570	640	590	690	690	740	680	840	700	750	650		633	1700
Hg Mercury	mg/kg	0.8	1.0	1.1	0.6	1.0	0.6	0.6	0.5	0.6	0.6	0.4	3.1	0.8	0.4	0.6	0.50	0.40	1.2	1.000	1.1	0.5	1.0	0.5	0.9		0.89	11
Mo Molybdenum	mg/kg	3.0	5.1	5.6	5.5	5.1	3.7	4.6	7.4	5.4	5.4	4.0	8.9	4.0	5.4	7	6.5	8.7	6.8	12.0	11.0	9.0	8.3	6		7	94	
Ni Nickel	mg/kg	43	45	38	32	36	26	29	29	29	26	27	27	32	30	38	42	47	49	56	54	64	56	64	56		40	420
Pb Lead	mg/kg	27	23	20	22	23	20	19	19	20	21	20	21	24	22	32	30	28	26	26	33	30	27	33	36		25	1100
Se Selenium	mg/kg	4	4	3	5	4	3	4	3	4	4	4	4	4	4	4	4	4	<4	5	4	4	4	4	4		4	34
Zn Zinc	mg/kg	730	800	720	690	740	580	630	640	600	620	640	640	680	690	780	850	900	960	880	1000	840	910	780	746		746	4200

2013 Tavistock Lagoon Dewatered Sludge													
Lab Number		CA15014-NOV13	CA15015-NOV13	CA15016-NOV13	CA15017-NOV13	CA15018-NOV13	Tavistock	CA12045-DEC13		Woodstock	Ingersoll	Tillsonburg	
Sample Date		1-Nov-13	1-Nov-13	1-Nov-13	1-Nov-13	1-Nov-13	Biosolids	Nov. 26 to 30		Biosolids	Biosolids	Biosolids	
		TOP	North	South	East	West	Average	Application		Average	Average	Average	
Specific Gravity		1.1	1.1	1.9	1.6	1.2	1.4	1.4		1.03	1.05	1.00	
Oil & Grease (total)		4500	1400	1300	33000	1300	8300	1400		47250	34500	3225	
pH	units	7.70	7.30	8.24	7.71	8.08	7.81	7.55		7.14	7.19	5.78	
Alkalinity (as CaCO3)		2540	1500	6270	1400	1360	2614	1550		2605	1738	398	
Total Solids	mg/L	28.2	18.8	71.0	62.3	63.3	48.7	60.2		27.4	21.8	22.5	
Volatile Solids	mg/L	8.10	3.63	2.60	3.45	3.51	4.3	4.10		14.3	14.1	15.1	
Total Nitrogen-kjeldahl (N)	mg/L	3300	1500	900	1600	2000	1860	1600		8125	10200	8625	
Ammonia+Ammonium (N)	mg/L	100	100	100	100	100	100			725	1200	125	
Nitrite as N	mg/L	0.2	0.2	0.2	0.2	0.2	0.2	0.8		0.8	0.6	25.5	
Nitrate as N	mg/L	17	0.3	0.3	0.3	0.3	3.6	0.3		0.3	0.3	330	
Nitrite+Nitrate as N	mg/L	17	0.3	0.3	0.3	0.3	3.6	0.8		0.9	0.6	355	
As Arsenic	mg/kg	4.8	2.8	2.1	2.8	2.8	3	3.6		7	4.0	3.7	
B Boron	mg/kg	17	16	9	9	8	12	7		34	33	24	
Ca Calcium	mg/kg	35000	55000	91000	71000	49000	60200	49000		40250	33000	25750	
Cd Cadmium	mg/kg	0.2	0.41	0.07	0.19	0.17	0.21	<0.1		0.90	1.31	0.67	
Co Cobalt	mg/kg	4	5	6	6	7	6	6		5	5	4.5	
Cr Chromium	mg/kg	12	60	13	16	17	24	17		67	43	24	
Cu Copper	mg/kg	59	46	15	18	17	31	16		730	653	700	
Hg Mercury	mg/kg	0.2	0.3	0.1	0.1	0.1	0.2	0.1		0.98	0.48	0.78	
K Potassium	mg/kg	910	1600	1800	1700	1600	1522	1500		693	860	2153	
Mg Magnesium	mg/kg	3700	7400	16000	11000	9200	9460	8900		5475	4225	2775	
Mo Molybdenum	mg/kg	23	10.0	2.4	3.9	4.1	8.7	3.6		10.2	21.3	8.1	
Na Sodium	mg/kg	320	1700	390	510	540	692	510		763	1225	1600	
Ni Nickel	mg/kg	7	10	12	12	14	11	12		74	37	52	
P Phosphorus	mg/kg	12000	29000	1500	2800	2300	9520	3800		32000	32000	43000	
Pb Lead	mg/kg	10.0	14.0	7.5	10	11	11	9.3		39	25	28	
Se Selenium	mg/kg	4	5	2	2	2	3	2		4	6	4.7	
Zn Zinc	mg/kg	130	86	42	54	57	74	52		1025	1600	898	
Total Organic Carbon	%	10.0	5.10	1.49	2.25	2.46							
All results less than MDL taken as MDL								17					
Results Compared to Criteria							Average	1000		Average	Average	Average	
As Arsenic	170mg/kg	mg/kg	4.8	2.8	2.1	2.8	2.8	3.1	7.0	170	6.8	4.0	3.7
Cd Cadmium	34 mg/kg	mg/kg	0.20	0.41	0.07	0.19	0.17	0.21	6.00	34	0.90	1.31	0.67
Co Cobalt	340 mg/kg	mg/kg	4	5	6	6	7	6	17	340	5	5	5
Cr Chromium	2800 mg/kg	mg/kg	12	60	13	16	17	24	16	2800	67	43	24
Cu Copper	1700 mg/kg	mg/kg	59	46	15	18	17	31	0	1700	730	653	700
Hg Mercury	11 mg/kg	mg/kg	0.2	0.3	0.1	0.1	0.1	0.2	1500.0	11	0.98	0.48	0.78
Mo Molybdenum	94 mg/kg	mg/kg	23	10	2	4	4	9	510	94	10	21	8
Ni Nickel	420 mg/kg	mg/kg	7	10	12	12	14	11	3800	420	74	37	52
Pb Lead	1100 mg/kg	mg/kg	10	14	8	10	11	11	2	1100	39	25	28
Se Selenium	34 mg/kg	mg/kg	4	5	2	2	2	3	52	34	4	6	5
Zn Zinc	4200 mg/kg	mg/kg	130	86	42	54	57	74	17	4200	1025	1600	898

EXHIBIT 2

Ingersoll WWTP De-Water Sludge 2012 to 2013

Lab Number	CA12550-SEP13		
Sample Date	September 17 & 18		
	NASM 21403		
		Field 3	Average
Specific Gravity		1.0	1.0
Oil & Grease (total)		29000	
pH	units	8.54	8.5
Alkalinity (mg/L as CaCO3)		11300	11300
Total Solids	mg/L	17.8	17.8
Volatile Solids	mg/L	11.8	11.8
Total Nitrogen-kjeldahl (N)	mg/L	9500	9500
Ammonia+Ammonium (N)	mg/L	4600	4600
Nitrite as N	mg/L	0.2	0.2
Nitrate as N	mg/L	0.3	0.3
Nitrite+Nitrate as N	mg/L	0.3	0.3
As Arsenic	mg/kg	3	3.0
B Boron	mg/kg	48	48
Ca Calcium	mg/kg	44000	44000
Cd Cadmium	mg/kg	0.30	0.30
Co Cobalt	mg/kg	6	6
Cr Chromium	mg/kg	63	63
Cu Copper	mg/kg	760	760
Hg Mercury	mg/kg	3.1	3.1
K Potassium	mg/kg	1200	1200
Mg Magnesium	mg/kg	5600	5600
Mo Molybdenum	mg/kg	22	22.0
Na Sodium	mg/kg	1800	1800.0
Ni Nickel	mg/kg	37	37.0
P Phosphorus	mg/kg	42000	42000.0
Pb Lead	mg/kg	29	29.0
Se Selenium	mg/kg	6	6.0
Zn Zinc		2000	2000.0
E Coli (cfu/1gm dried wgt)		2364	2364
All results less than MDL taken as MDL			
Results Compared to Criteria			
As Arsenic	mg/kg	3.0	3.0
Cd Cadmium	mg/kg	0.30	0.30
Co Cobalt	mg/kg	6.0	6.0
Cr Chromium	mg/kg	63	63
Cu Copper	mg/kg	760	760
Hg Mercury	mg/kg	3.1	3.1
Mo Molybdenum	mg/kg	22	22
Ni Nickel	mg/kg	37	37
Pb Lead	mg/kg	29	29
Se Selenium	mg/kg	6	6
Zn Zinc	mg/kg	2000	2000

Geomean
Criteria
2,000,000

2013 Woodstock WWTP Dewatered Sludge

Biosolids Centralized Storage Facility

Lab Number	CA13252-SEP13	CA13358-SEP13	CA13391-SEP13	CA13563-SEP13	CA14723-SEP13
Sample Date	Sept. 9 to 10	September 10 & 11	16-Sep-03	September 18 to 19	September 19 to 20
NASM Number	NASM 21359	NASM 21181	NASM 21181	NASM 21403	NASM 21407
Specific Gravity	1.1	1.1	1.0	1.0	1.0
Oil & Grease (total)	45000	48000	41000	40000	44000
pH	8.17	8.11	8.24	8.28	8.16
Alkalinity (as CaCO3)	4350	5040	5910	11200	6910
Total Solids	24.9	25.1	24.8	24.3	25.7
Volatile Solids	13.8	13.4	14.1	13.8	13.9
Total Nitrogen-kjeldahl (N)	9700	7700	9900	9600	10000
Ammonia+Ammonium (N)	2500	2400	1900	3000	2200
Nitrite as N	1.0	1.1	5.8	3.9	0.2
Nitrate as N	0.3	0.3	16	0.3	0.3
Nitrite+Nitrate as N	1.0	1.1	22	3.9	0.3
As Arsenic	7.5	5.2	4.6	2	3.1
B Boron	42	24	28	30	30
Ca Calcium	39000	36000	37000	34000	45000
Cd Cadmium	1.2	0.92	0.93	0.2	0.2
Co Cobalt	7	4	4	4	4
Cr Chromium	80	69	66	58	70
Cu Copper	730	690	700	730	800
Hg Mercury	1.0	0.3	0.4	0.4	0.8
K Potassium	980	880	810	820	790
Mg Magnesium	5000	4900	4600	4000	6000
Mo Molybdenum	13	9.2	10	13	14
Na Sodium	1000	940	920	940	880
Ni Nickel	120	110	120	130	96
P Phosphorus	39000	35000	36000	35000	37000
Pb Lead	37	41	33	30	41
Se Selenium	4	4	4	4	4
Zn Zinc	1400	1000	1100	1200	1100
E Coli (cfu/1gm dried wgt)	156564	15550	322	123	66122

All results less than MDL taken as MDL

Results Compared to Criteria					Criteria			
As	Arsenic	170mg/kg	mg/kg	7.5	5.2	4.6	2.0	170
Cd	Cadmium	34 mg/kg	mg/kg	1.20	0.92	0.93	0.20	34
Co	Cobalt	340 mg/kg	mg/kg	7	4	4	4	340
Cr	Chromium	2800 mg/kg	mg/kg	80	69	66	58	2800
Cu	Copper	1700 mg/kg	mg/kg	730	690	700	730	1700
Hg	Mercury	11 mg/kg	mg/kg	1.0	0.3	0.4	0.4	11
Mo	Molybdenum	94 mg/kg	mg/kg	13	9	10	13	94
Ni	Nickel	420 mg/kg	mg/kg	120	110	120	130	420
Pb	Lead	1100 mg/kg	mg/kg	37	41	33	30	1100
Se	Selenium	34 mg/kg	mg/kg	4	4	4	4	34
Zn	Zinc	4200 mg/kg	mg/kg	1400	1000	1100	1200	4200

2013 Thamesford WWTP Secondary Digester							
Lab Number		CA19118-MAY13	CA12769-MAY13	CA19044-NOV13			
Sample Date		May 14 to 17, 2013	May 21 to 22, 2013	Nov. 11, 12 & 13			
		NASM 20245	NASM 20245	NASM 20244		Average	
Specific Gravity		1.0	1.0	1.0		1.0	
pH	units	7.22	7.09	7.53		7.28	
Alkalinity (mg/L as CaCO3)	mg/L	2220	2080	3020		2440	
Total Solids	mg/L	25300	31800	27900		28333	
Volatile Solids	mg/L	18100	22600	19100		19933	
Total Nitrogen-kjeldahl (N)	mg/L	2520	2440	2410		2457	
Ammonia+Ammonium (N)	mg/L	562	607	756		642	
Nitrite as N	mg/L	2.0	1.9	0.2		1.4	
Nitrate as N	mg/L	0.3	0.3	0.3		0.3	
Nitrite+Nitrate as N	mg/L	2.0	1.9	0.3		1.4	
Oil & Grease (Total)	mg/L	62	86	346		165	
As Arsenic	mg/L	0.3	0.3	0.3		0.3	
B Boron	mg/L	0.89	1.3	1.2		1.1	
Ca Calcium	mg/L			1100			
Cd Cadmium	mg/L	0.03	0.03	0.03		0.03	
Co Cobalt	mg/L	0.05	0.07	0.05		0.06	
Cr Chromium	mg/L	0.7	1.2	1.0		1.0	
Cu Copper	mg/L	5.8	9.0	9.1		7.967	
Hg Mercury	mg/L	0.002	0.002	0.001		0	
K Potassium	mg/L	130	160	120		137	
Mg Magnesium	mg/L			170			
Mo Molybdenum	mg/L	0.10	0.2	0.2		0.17	
Na Sodium	mg/L	270	340	290		300	
Ni Nickel	mg/L	0.40	0.7	0.6		0.6	
P Phosphorus	mg/L	850	1300	1100		1083	
Pb Lead	mg/L	0.10	0.20	0.3		0.20	
Se Selenium	mg/L	0.30	0.30	0.3		0.30	Criteria
Zn Zinc	mg/L	11	16	16		14	Geomean
E Coli (cfu/1gm dried wgt)		2015810	716981	860215		1075280	2,000,000
All results less than MDL taken as MDL							
Results Compared to Criteria						Average	Criteria
As Arsenic	mg/kg	12	9	16		12	170
Cd Cadmium	mg/kg	1.2	0.9	1.6		1.2	34
Co Cobalt	mg/kg	2.0	2.2	2.6		2.3	340
Cr Chromium	mg/kg	28	38	52		39	2800
Cu Copper	mg/kg	229	283	476		330	1700
Hg Mercury	mg/kg	0.079	0.063	0.052		0.065	11
Mo Molybdenum	mg/kg	4	6	10		7	94
Ni Nickel	mg/kg	16	22	31		23	420
Pb Lead	mg/kg	4	6	16		9	1100
Se Selenium	mg/kg	12	9	16		12	34
Zn Zinc	mg/kg	435	503	838		592	4200

Tillsonburg WWTP De-Water Sludge 2013

Lab Number	CA19006-MAY13	CA13429-SEP13	CA12551-SEP13	CA13564-SEP13		
Sample Date	3-May-13	16-Sep-13	18-Sep-03	18-Sep-03		
	NASM 21170	NASM 21360	NASM 21403	NASM 21403	Average	
			Field 3	Field 1		
Specific Gravity	1.0	1.0	1.0	1.0	1.0	
Oil & Grease (total)	2500	3500	5700	19000	7675	
pH	7.28	8.02	8.13	7.93	7.84	
Alkalinity (mg/L as CaCO3)	2930	5070	4760	6210	4743	
Total Solids	17.9	18.3	18.3	19.4	18	
Volatile Solids	12.0	12.2	11.8	12.0	12	
Total Nitrogen-kjeldahl (N)	12000	9300	7200	9500	9500	
Ammonia+Ammonium (N)	800	2200	2200	2400	1900	
Nitrite as N	0.7	2.0	0.2	8.0	2.7	
Nitrate as N **	0.3	0.3	0.3	0.3	0.3	
Nitrite+Nitrate as N	0.7	2.0	0.3	8.0	2.8	
As Arsenic **	3	3	3	3	3.0	
B Boron	26	28	17	19	22.5	
Ca Calcium	29000	35000	30000	38000	33000	
Cd Cadmium **	0.73	0.44	0.3	0.3	0.44	
Co Cobalt	6	6	6	5	5.75	
Cr Chromium	26	27	20	38	27.8	
Cu Copper	630	740	680	740	698	
Hg Mercury	1.6	0.5	0.4	0.5	0.750	
K Potassium	3200	3300	2200	2500	2800	
Mg Magnesium	3700	4200	3500	4600	4000	
Mo Molybdenum	5.8	3.8	7.2	7.6	6.1	
Na Sodium	1600	1900	1500	1700	1675	
Ni Nickel	37	44	34	57	43.0	
P Phosphorus	38000	47000	42000	46000	43250	
Pb Lead	21	30	32	32	28.8	
Se Selenium **	6	6	6	5	5.8	Geomean
Zn Zinc	750	920	860	940	867.5	Criteria
E Coli (cfu/1gm dried wgt)	665921	34483	262438	2682	63406	2,000,000
** All results less than MDL taken as MDL						
Results Compared to Criteria						Criteria
As Arsenic	mg/kg	3.0	3.0	3.0	3.0	170
Cd Cadmium	mg/kg	0.73	0.44	0.30	0.30	34
Co Cobalt	mg/kg	6.0	6.0	6.0	5.0	340
Cr Chromium	mg/kg	26	27	20	38	2800
Cu Copper	mg/kg	630	740	680	740	1700
Hg Mercury	mg/kg	1.6	0.5	0.4	0.5	11
Mo Molybdenum	mg/kg	6	4	7	8	94
Ni Nickel	mg/kg	37	44	34	57	420
Pb Lead	mg/kg	21	30	32	32	1100
Se Selenium	mg/kg	6	6	6	5	34
Zn Zinc	mg/kg	750	920	860	940	4200

EXHIBIT 3

NASM Applied - Oxford Cake - 2013

Start Date	NASM Plan #	% Solids	Lot	Concession	GeoTownship	County	Ha Spread	Tillsonburg WT	Tillsonburg DT	Woodstock WT	Woodstock DT	Ingersoll WT	Ingersoll DT	Total WT	Total DT
May															
21170		24.77	24 & 25	6	Zorra	Oxford	11.36	276.02	68.16	0	0	0	0	276.02	68.16
May Total:							11.36	276.02	68.16	0	0	0	0	276.02	68.16
September															
21181		25.19	8,9	1N	Zorra	Oxford	34.42	0	0	1069.09	268.48	0	0	1069.09	268.48
21359		25.19	12	1N	Zorra	Oxford	18.98	0	0	630.195	161.33	0	0	630.195	161.33
21360		24.729	1	5	Zorra	Oxford	11.09	305.72	75.41	0	0	0	0	305.72	75.41
21403		25.45	18	3	Blenheim	Oxford	34.23	349.26	86.04	225.86	57.52	521.02	108.65	1096.14	252.21
21407		25.39	6S	1	Blandford	Oxford	16.44	0	0	428.18	108.5	0	0	428.18	108.5
September Total:							115.2	654.98	161.45	2353.325	595.83	521.02	108.65	3529.325	865.93
2013 Total:							126.5	931	229.61	2353.325	595.83	521.02	108.65	3805.35	934.09

NASM Applied - Thamesford - 2013

Start Date	NASM Plan #	% Solids	Lot	Concession	GeoTownship	County	Hectares Spread	m ³
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May

	20245	2.67	4	6	Nissouri	Middlesex	38.31	2542	
							May Total:	38.31	2542

November

11-Nov-13	20244	2.49	PT 4	7	Nissouri	Middlesex	21.79	2736	
							November Total:	21.79	2736

2013 Total: 60.1 5278



Annual Report:
 NASM: #21170
 Material Applied: Tillsonburg
 Date of Application: May 3, 2013

Nutrient Concentration (ppm - dry basis)

Date Sampled	TKN	Ammonium	Nitrate	Organic N (TKN - Ammonium)	Plant Avail N (Ammonium + Nitrate)	Copper	Phosphorus	Zinc	Solids
4 Recent Avg.	10600	200	238.71	10400.00	438.71	610.00	38500.00	687.14	247700.00
Average (kg/tonne)	1.06	0.02	0.02	1.04	0.04	0.06	3.85	0.07	24.77

** Sample results from SGS Lakefield Reseach Limited

Total Area: ha	4.09	Total Volume Applied (t)	99	Application Rate	24.30	tonne/Ha	Dry Tonnes /ha	6.00
Total Area: ac	10.10				10.82	ton/ac		

NUTRIENT VALUE						
Nutrient	Organic N	Plant Aval N	Copper	Phosphorus	Zinc	Total Solids
Kg/Ha	25.17	1.06	1.48	93.19	1.66	599.57
LBS/ Acre	22.46	0.95	1.32	83.15	1.48	535.00

ORGANIC N (TKN) RELEASE		
YEAR	% N Release	LBs N/ Acre
Year 1	30%	6.74
Year 2	10%	2.25
Year 3	5%	1.12

PHOSPHORUS AVAILABILITY		
YEAR	% P Release	LBs P/Acre
Year 1	40%	33.26
Year 2	40%	33.26
Year 3	20%	16.63

Application Rate of Metals											
	As	Cd	Co	Cr	Cu	Hg	Mo	Ni	Pb	Se	Zn
Kg/ Ha	0.019	0.003	0.025	0.156	3.672	0.004	0.030	0.206	0.132	0.025	4.136
LBS/ Arce	0.017	0.003	0.022	0.139	3.277	0.004	0.027	0.184	0.118	0.022	3.691
maximum allowable addition (kg/ha) per 5	1.1	0.27	2.7	23.30	13.6	0.09	0.8	3.56	9	0.27	33

Metals Not Beneficial for Agriculture

Metals Beneficial for Agriculture



Annual Report:
 NASM: #21181
 Material Applied: Woodstock
 Date of Application: September 10, 11, & 16, 2013

Nutrient Concentration (ppm - dry basis)

Date Sampled	TKN	Ammonium	Nitrate	Organic N (TKN - Ammonium)	Plant Avail N (Ammonium + Nitrate)	Copper	Phosphorus	Zinc	Solids
4 Recent Avg.	8360	900	1.86	7460.00	901.86	650.00	32880.00	951.25	251900.00
Average (kg/tonne)	0.84	0.09	0.00	0.75	0.09	0.07	3.29	0.10	25.19

** Sample results from SGS Lakefield Research Limited

Total Area: ha	34.42	Total Volume Applied (t)	1069	Application Rate	31.10	tonne/Ha	Dry Tonnes /ha	7.80
Total Area: ac	85.02				13.85	ton/ac		

NUTRIENT VALUE						
Nutrient	Organic N	Plant Aval N	Copper	Phosphorus	Zinc	Total Solids
Kg/Ha	23.17	2.80	2.02	102.12	2.95	782.34
LBS/ Acre	20.67	2.50	1.80	91.12	2.64	698.09

ORGANIC N (TKN) RELEASE		
YEAR	% N Release	LBs N/ Acre
Year 1	30%	6.20
Year 2	10%	2.07
Year 3	5%	1.03

PHOSPHORUS AVAILABILITY		
YEAR	% P Release	LBs P/Acre
Year 1	40%	36.45
Year 2	40%	36.45
Year 3	20%	18.22

Application Rate of Metals											
	As	Cd	Co	Cr	Cu	Hg	Mo	Ni	Pb	Se	Zn
Kg/ Ha	0.041	0.004	0.039	0.486	5.086	0.004	0.072	0.938	0.277	0.031	7.443
LBS/ Arce	0.037	0.004	0.035	0.434	4.538	0.004	0.064	0.837	0.247	0.028	6.641
maximum allowable addition (kg/ha) per 5 years	1.1	0.27	2.7	23.30	13.6	0.09	0.8	3.56	9	0.27	33

Metals Not Beneficial for Agriculture

Metals Beneficial for Agriculture



Annual Report:
 NASM: #21359
 Material Applied: Woodstock
 Date of Application: September 9 & 10, 2013

Nutrient Concentration (ppm - dry basis)

Date Sampled	TKN	Ammonium	Nitrate	Organic N (TKN - Ammonium)	Plant Avail N (Ammonium + Nitrate)	Copper	Phosphorus	Zinc	Solids
4 Recent Avg.	8330	900	1.86	7430.00	901.86	650.00	32880.00	951.25	251900.00
Average (kg/tonne)	0.83	0.09	0.00	0.74	0.09	0.07	3.29	0.10	25.19

** Sample results from SGS Lakefield Research Limited

Total Area: ha	18.98	Total Volume Applied (t)	630	Application Rate	33.20	tonne/Ha	Dry Tonnes /ha	8.40
Total Area: ac	46.88				14.79	ton/ac		

NUTRIENT VALUE						
Nutrient	Organic N	Plant Aval N	Copper	Phosphorus	Zinc	Total Solids
Kg/Ha	24.66	2.99	2.16	109.14	3.16	836.13
LBS/ Acre	22.01	2.67	1.93	97.38	2.82	746.08

ORGANIC N (TKN) RELEASE		
YEAR	% N Release	LBs N/ Acre
Year 1	30%	6.60
Year 2	10%	2.20
Year 3	5%	1.10

PHOSPHORUS AVAILABILITY		
YEAR	% P Release	LBs P/Acre
Year 1	40%	38.95
Year 2	40%	38.95
Year 3	20%	19.48

Application Rate of Metals											
	As	Cd	Co	Cr	Cu	Hg	Mo	Ni	Pb	Se	Zn
Kg/ Ha	0.044	0.005	0.042	0.520	5.436	0.004	0.077	1.003	0.296	0.033	7.955
LBS/ Arce	0.039	0.004	0.037	0.464	4.851	0.004	0.069	0.895	0.264	0.029	7.098
maximum allowable addition (kg/ha) per 5 years	1.1	0.27	2.7	23.30	13.6	0.09	0.8	3.56	9	0.27	33

Metals Not Beneficial for Agriculture

Metals Beneficial for Agriculture



Annual Report:
 NASM: #21360
 Material Applied: Tillsonburg
 Date of Application: September 16, 2013

Nutrient Concentration (ppm - dry basis)

Date Sampled	TKN	Ammonium	Nitrate	Organic N (TKN - Ammonium)	Plant Avail N (Ammonium + Nitrate)	Copper	Phosphorus	Zinc	Solids
4 Recent Avg.	9370	120	307.143	9250.00	427.14	575.71	39000.00	664.29	247290.00
Average (kg/tonne)	0.94	0.01	0.03	0.93	0.04	0.06	3.90	0.07	24.73

** Sample results from SGS Lakefield Reseach Limited

Total Area: ha	11.09	Total Volume Applied (t)	306	Application Rate	27.60	tonne/Ha	Dry Tonnes /ha	6.80
Total Area: ac	27.39				12.29	ton/ac		

NUTRIENT VALUE						
Nutrient	Organic N	Plant Aval N	Copper	Phosphorus	Zinc	Total Solids
Kg/Ha	25.52	1.18	1.59	107.61	1.83	682.33
LBS/ Acre	22.77	1.05	1.42	96.02	1.64	608.85

ORGANIC N (TKN) RELEASE		
YEAR	% N Release	LBs N/ Acre
Year 1	30%	6.83
Year 2	10%	2.28
Year 3	5%	1.14

PHOSPHORUS AVAILABILITY		
YEAR	% P Release	LBs P/Acre
Year 1	40%	38.41
Year 2	40%	38.41
Year 3	20%	19.20

Application Rate of Metals											
	As	Cd	Co	Cr	Cu	Hg	Mo	Ni	Pb	Se	Zn
Kg/ Ha	0.017	0.003	0.026	0.164	3.925	0.008	0.039	0.204	0.155	0.026	4.529
LBS/ Arce	0.015	0.003	0.023	0.146	3.502	0.007	0.035	0.182	0.138	0.023	4.041
maximum allowable addition (kg/ha) per 5 years	1.1	0.27	2.7	23.30	13.6	0.09	0.8	3.56	9	0.27	33

Metals Not Beneficial for Agriculture

Metals Beneficial for Agriculture



Annual Report:
 NASM: #21403
 Material Applied: Ingersoll
 Date of Application: September 17, 2013

Nutrient Concentration (ppm - dry basis)

Date Sampled	TKN	Ammonium	Nitrate	Organic N (TKN - Ammonium)	Plant Avail N (Ammonium + Nitrate)	Copper	Phosphorus	Zinc	Solids
4 Recent Avg.	11100	1325	12.98	9775.00	1337.98	606.25	34750.00	1700.00	208800.00
Average (kg/tonne)	1.11	0.13	0.00	0.98	0.13	0.06	3.48	0.17	20.88

** Sample results from SGS Lakefield Research Limited

Total Area: ha	14.11	Total Volume Applied (t)	521	Application Rate	36.90	tonne/Ha	Dry Tonnes /ha	7.70
Total Area: ac	34.85				16.43	ton/ac		

NUTRIENT VALUE						
Nutrient	Organic N	Plant Aval N	Copper	Phosphorus	Zinc	Total Solids
Kg/Ha	36.09	4.94	2.24	128.31	6.28	770.98
LBS/ Acre	32.21	4.41	2.00	114.49	5.60	687.95

ORGANIC N (TKN) RELEASE		
YEAR	% N Release	LBs N/ Acre
Year 1	30%	9.66
Year 2	10%	3.22
Year 3	5%	1.61

PHOSPHORUS AVAILABILITY		
YEAR	% P Release	LBs P/Acre
Year 1	40%	45.80
Year 2	40%	45.80
Year 3	20%	22.90

Application Rate of Metals											
	As	Cd	Co	Cr	Cu	Hg	Mo	Ni	Pb	Se	Zn
Kg/ Ha	0.041	0.003	0.038	0.427	4.671	0.002	0.141	0.306	0.151	0.040	13.098
LBS/ Arce	0.037	0.003	0.034	0.381	4.168	0.002	0.126	0.273	0.135	0.036	11.687
maximum allowable addition (kg/ha) per 5 years	1.1	0.27	2.7	23.30	13.6	0.09	0.8	3.56	9	0.27	33

Metals Not Beneficial for Agriculture

Metals Beneficial for Agriculture



Annual Report:
 NASM: #21403
 Material Applied: Woodstock
 Date of Application: September 18, 2013

Nutrient Concentration (ppm - dry basis)

Date Sampled	TKN	Ammonium	Nitrate	Organic N (TKN - Ammonium)	Plant Avail N (Ammonium + Nitrate)	Copper	Phosphorus	Zinc	Solids
4 Recent Avg.	7410	812.5	1.56	6597.50	814.06	662.50	32500.00	957.50	254500.00
Average (kg/tonne)	0.74	0.08	0.00	0.66	0.08	0.07	3.25	0.10	25.45

** Sample results from SGS Lakefield Reseach Limited

Total Area: ha	7.47	Total Volume Applied (t)	226	Application Rate	30.20	tonne/Ha	Dry Tonnes /ha	7.70
Total Area: ac	18.45				13.45	ton/ac		

NUTRIENT VALUE						
Nutrient	Organic N	Plant Aval N	Copper	Phosphorus	Zinc	Total Solids
Kg/Ha	19.96	2.46	2.00	98.33	2.90	769.97
LBS/ Acre	17.81	2.20	1.79	87.74	2.58	687.05

ORGANIC N (TKN) RELEASE		
YEAR	% N Release	LBs N/ Acre
Year 1	30%	5.34
Year 2	10%	1.78
Year 3	5%	0.89

PHOSPHORUS AVAILABILITY		
YEAR	% P Release	LBs P/Acre
Year 1	40%	35.10
Year 2	40%	35.10
Year 3	20%	17.55

Application Rate of Metals											
	As	Cd	Co	Cr	Cu	Hg	Mo	Ni	Pb	Se	Zn
Kg/ Ha	0.041	0.004	0.038	0.491	5.097	0.006	0.075	0.897	0.281	0.033	7.367
LBS/ Arce	0.037	0.004	0.034	0.438	4.548	0.005	0.067	0.800	0.251	0.029	6.574
maximum allowable addition (kg/ha) per 5 years	1.1	0.27	2.7	23.30	13.6	0.09	0.8	3.56	9	0.27	33

Metals Not Beneficial for Agriculture

Metals Beneficial for Agriculture



AMERICAN WATER
Terratec Environmental

Annual Report:
NASM: #21403
Material Applied: Tillsonburg
Date of Application: September 18, 2013

Nutrient Concentration (ppm - dry basis)

Date Sampled	TKN	Ammonium	Nitrate	Organic N (TKN - Ammonium)	Plant Avail N (Ammonium + Nitrate)	Copper	Phosphorus	Zinc	Solids
4 Recent Avg.	9370	120	307.14	9250.00	427.14	575.71	39000.00	664.29	247300.00
Average (kg/tonne)	0.94	0.01	0.03	0.93	0.04	0.06	3.90	0.07	24.73

** Sample results from SGS Lakefield Research Limited

Total Area: ha	4.60	Total Volume Applied (t)	128	Application Rate	27.90	tonne/Ha	Dry Tonnes /ha	6.90
Total Area: ac	11.36				12.43	ton/ac		

NUTRIENT VALUE

Nutrient	Organic N	Plant Aval N	Copper	Phosphorus	Zinc	Total Solids
Kg/Ha	25.74	1.19	1.60	108.52	1.85	688.14
LBS/ Acre	22.97	1.06	1.43	96.83	1.65	614.03

ORGANIC N (TKN) RELEASE

YEAR	% N Release	LBs N/ Acre
Year 1	30%	6.89
Year 2	10%	2.30
Year 3	5%	1.15

PHOSPHORUS AVAILABILITY

YEAR	% P Release	LBs P/Acre
Year 1	40%	38.73
Year 2	40%	38.73
Year 3	20%	19.37

Application Rate of Metals

	As	Cd	Co	Cr	Cu	Hg	Mo	Ni	Pb	Se	Zn
Kg/ Ha	0.017	0.003	0.027	0.166	3.972	0.009	0.039	0.206	0.157	0.027	4.583
LBS/ Arce	0.015	0.003	0.024	0.148	3.544	0.008	0.035	0.184	0.140	0.024	4.089
maximum allowable addition (kg/ha) per 5 years	1.1	0.27	2.7	23.30	13.6	0.09	0.8	3.56	9	0.27	33

Metals Not Beneficial for Agriculture

Metals Beneficial for Agriculture



Annual Report:
 NASM: #21403
 Material Applied: Tillsonburg
 Date of Application: September 18, 2013

Nutrient Concentration (ppm - dry basis)

Date Sampled	TKN	Ammonium	Nitrate	Organic N (TKN - Ammonium)	Plant Avail N (Ammonium + Nitrate)	Copper	Phosphorus	Zinc	Solids
4 Recent Avg.	9370	120	307.14	9250.00	427.14	575.71	39000.00	664.29	247300.00
Average (kg/tonne)	0.94	0.01	0.03	0.93	0.04	0.06	3.90	0.07	24.73

** Sample results from SGS Lakefield Research Limited

Total Area: ha	1.58	Total Volume Applied (t)	36	Application Rate	22.90	tonne/Ha	Dry Tonnes /ha	5.70
Total Area: ac	3.90				10.20	ton/ac		

NUTRIENT VALUE						
Nutrient	Organic N	Plant Aval N	Copper	Phosphorus	Zinc	Total Solids
Kg/Ha	21.08	0.97	1.31	88.86	1.51	563.47
LBS/ Acre	18.81	0.87	1.17	79.29	1.35	502.79

ORGANIC N (TKN) RELEASE		
YEAR	% N Release	LBs N/ Acre
Year 1	30%	5.64
Year 2	10%	1.88
Year 3	5%	0.94

PHOSPHORUS AVAILABILITY		
YEAR	% P Release	LBs P/Acre
Year 1	40%	31.72
Year 2	40%	31.72
Year 3	20%	15.86

Application Rate of Metals											
	As	Cd	Co	Cr	Cu	Hg	Mo	Ni	Pb	Se	Zn
Kg/ Ha	0.014	0.002	0.022	0.136	3.260	0.007	0.032	0.169	0.129	0.022	3.762
LBS/ Arce maximum	0.012	0.002	0.020	0.121	2.909	0.006	0.029	0.151	0.115	0.020	3.357
allowable addition (kg/ha) per 5 years	1.1	0.27	2.7	23.30	13.6	0.09	0.8	3.56	9	0.27	33

Metals Not Beneficial for Agriculture

Metals Beneficial for Agriculture



Annual Report:
 NASM: #21403
 Material Applied: Tillsonburg
 Date of Application: September 17, 2013

Nutrient Concentration (ppm - dry basis)

Date Sampled	TKN	Ammonium	Nitrate	Organic N (TKN - Ammonium)	Plant Avail N (Ammonium + Nitrate)	Copper	Phosphorus	Zinc	Solids
4 Recent Avg.	9370	120	307.14	9250.00	427.14	575.71	39000.00	664.29	247300.00
Average (kg/tonne)	0.94	0.01	0.03	0.93	0.04	0.06	3.90	0.07	24.73

** Sample results from SGS Lakefield Research Limited

Total Area: ha	6.47	Total Volume Applied (t)	184	Application Rate	28.40	tonne/Ha	Dry Tonnes /ha	7.00
Total Area: ac	15.98				12.65	ton/ac		

NUTRIENT VALUE						
Nutrient	Organic N	Plant Aval N	Copper	Phosphorus	Zinc	Total Solids
Kg/Ha	26.31	1.21	1.64	110.91	1.89	703.30
LBS/ Acre	23.47	1.08	1.46	98.97	1.69	627.56

ORGANIC N (TKN) RELEASE		
YEAR	% N Release	LBs N/ Acre
Year 1	30%	7.04
Year 2	10%	2.35
Year 3	5%	1.17

PHOSPHORUS AVAILABILITY		
YEAR	% P Release	LBs P/Acre
Year 1	40%	39.59
Year 2	40%	39.59
Year 3	20%	19.79

Application Rate of Metals											
	As	Cd	Co	Cr	Cu	Hg	Mo	Ni	Pb	Se	Zn
Kg/ Ha	0.018	0.003	0.027	0.169	4.043	0.009	0.040	321.000	0.160	0.027	4.665
LBS/ Arce	0.016	0.003	0.024	0.151	3.608	0.008	0.036	286.431	0.143	0.024	4.163
maximum allowable addition (kg/ha) per 5 years	1.1	0.27	2.7	23.30	13.6	0.09	0.8	3.56	9	0.27	33

Metals Not Beneficial for Agriculture

Metals Beneficial for Agriculture



Annual Report:
 NASM: #21407
 Material Applied: Woodstock
 Date of Application: September 19, 2013

Nutrient Concentration (ppm - dry basis)

Date Sampled	TKN	Ammonium	Nitrate	Organic N (TKN - Ammonium)	Plant Avail N (Ammonium + Nitrate)	Copper	Phosphorus	Zinc	Solids
4 Recent Avg.	7580	844.44	1.69	6735.56	846.13	655.56	32400.00	951.11	253900.00
Average (kg/tonne)	0.76	0.08	0.00	0.67	0.08	0.07	3.24	0.10	25.39

** Sample results from SGS Lakefield Research Limited

Total Area: ha	16.44	Total Volume Applied (t)	428	Application Rate	26.10	tonne/Ha	Dry Tonnes /ha	6.60
Total Area: ac	40.61				11.62	ton/ac		

NUTRIENT VALUE						
Nutrient	Organic N	Plant Aval N	Copper	Phosphorus	Zinc	Total Solids
Kg/Ha	17.54	2.20	1.71	84.35	2.48	661.00
LBS/ Acre	15.65	1.97	1.52	75.27	2.21	589.82

ORGANIC N (TKN) RELEASE		
YEAR	% N Release	LBs N/ Acre
Year 1	30%	4.69
Year 2	10%	1.56
Year 3	5%	0.78

PHOSPHORUS AVAILABILITY		
YEAR	% P Release	LBs P/Acre
Year 1	40%	30.11
Year 2	40%	30.11
Year 3	20%	15.05

Application Rate of Metals											
	As	Cd	Co	Cr	Cu	Hg	Mo	Ni	Pb	Se	Zn
Kg/ Ha	0.036	0.003	0.032	0.419	4.336	0.005	0.062	0.767	0.237	0.028	6.291
LBS/ Arce	0.032	0.003	0.029	0.374	3.869	0.004	0.055	0.684	0.211	0.025	5.614
maximum allowable addition (kg/ha) per 5 years	1.1	0.27	2.7	23.30	13.6	0.09	0.8	3.56	9	0.27	33

Metals Not Beneficial for Agriculture

Metals Beneficial for Agriculture



Annual Report:

NASM: #20245

Material Applied: Thamesford

Date of Application: May14, 15, 16, 17, 21, & 22, 2013

Nutrient Concentration (mg/L - wet basis)

Date Sampled	TKN	Ammonium	Nitrate	Organic N (TKN - Ammonium)	Plant Avail N (Nitrate + Ammonium)	Copper	Phosphorus	Zinc	Solids mg/kg
4 Month Avg.	1720	189.35	3.82	1530.65	193.17	7.80	80.00	14.73	2670.00
Average (Kg/m³)	1.72	0.19	0.00	1.53	0.19	0.01	0.08	0.01	2.67

** Sample results from SGS Lakefield Reseach Limited

Total Area: ha	38.31	Total Volume Applied m3	2542	Application Rate	66.40	M³/Ha	Dry Tonnes /ha	1.80
Total Area: ac	94.63				26.88	M³/Ac		

NUTRIENT VALUE

Nutrient	Organic N	Plant Aval N	Copper	Phosphourus	Zinc	Total Solids
Kg/Ha	101.56	12.82	0.52	5.31	0.98	177.16
LBS/ Acre	90.63	11.44	0.46	4.74	0.87	158.08

ORGANIC N (TKN) RELEASE

YEAR	% N Release	LBs N/ Acre
Year 1	30%	27.19
Year 2	10%	9.06
Year 3	5%	4.53

PHOSPHORUS AVAILABILITY

YEAR	% P Release	LBs P/Acre
Year 1	40%	1.89
Year 2	40%	1.89
Year 3	20%	0.95

Application Rate of Metals

	As	Cd	Co	Cr	Cu	Hg	Mo	Ni	Pb	Se	Zn
Kg/ Ha	0.020	0.002	0.005	0.043	0.518	0.000	0.013	0.030	0.015	0.020	0.977
LBS/ Arce	0.018	0.002	0.004	0.038	0.462	0.000	0.012	0.027	0.013	0.018	0.872
Maximum Allowable Addition (kg/ha) per 5 years	1.4	0.27	2.7	23.30	13.6	0.090	0.8	3.56	9	0.27	33

Metals Not Beneficial for Agriculture

Metals Beneficial for Agriculture



Nutrient Concentration (mg/L - wet basis)

Date Sampled	TKN	Ammonium	Nitrate	Organic N (TKN - Ammonium)	Plant Avail N (Nitrate + Ammonium)	Copper	Phosphorus	Zinc	Solids mg/kg
4 Month Avg.	1590	43.28	3.7	1546.72	46.98	6.86	970.00	9.55	2490.00
Average (Kg/m³)	1.59	0.04	0.00	1.55	0.05	0.01	0.97	0.01	2.49

** Sample results from SGS Lakefield Reseach Limited

Total Area: ha	21.79	Total Volume Applied m3	2736	Application Rate	125.60	M³/Ha	Dry Tonnes /ha	3.10
Total Area: ac	53.82				50.85	M³/Ac		

NUTRIENT VALUE

Nutrient	Organic N	Plant Aval N	Copper	Phosphourus	Zinc	Total Solids
Kg/Ha	194.21	5.90	0.86	121.80	1.20	312.65
LBS/ Acre	173.29	5.26	0.77	108.68	1.07	278.98

ORGANIC N (TKN) RELEASE

YEAR	% N Release	LBs N/ Acre
Year 1	30%	51.99
Year 2	10%	17.33
Year 3	5%	8.66

PHOSPHORUS AVAILABILITY

YEAR	% P Release	LBs P/Acre
Year 1	40%	43.47
Year 2	40%	43.47
Year 3	20%	21.74

Application Rate of Metals

	As	Cd	Co	Cr	Cu	Hg	Mo	Ni	Pb	Se	Zn
Kg/ Ha	0.038	0.004	0.006	0.079	0.861	0.001	0.023	0.055	0.025	0.038	1.199
LBS/ Arce	0.034	0.004	0.005	0.070	0.768	0.001	0.021	0.049	0.022	0.034	1.070
Maximum Allowable Addition (kg/ha) per 5 years	1.4	0.27	2.7	23.30	13.6	0.090	0.8	3.56	9	0.27	33

Metals Not Beneficial for Agriculture

Metals Beneficial for Agriculture

EXHIBIT 4

