NCDA&CS Agronomic Division **Phone: (919) 733-2655** **Website: www.ncagr.gov/agronomi/** **Report No.** FY13-SL019822

Heavy Metals

Soil Report

Mehlich-3 Extraction

Sampled: 01/04/2013 **Received:** 01/04/2013 **Completed:** 01/11/2013

Client: James Pearce
5795 Hwy 903
Roanoke Rapids, NC 27870

County: Halifax

Farm: 42-05

Advisor: Chester Cobb
NCDENR-Div of Waste Mgm
1646 Mail Service Ctr.
Raleigh, NC 276991646

Links to Helpful Information

Agronomist's Comments:

ATTENTION: This report was flagged with a "C" and/or "Z" to alert you that copper and/or zinc have accumulated in the soil and are approaching a level that could be detrimental to crop production. The C and Z symbols are printed on your report for soil test index levels of 2000 or more; for peanuts with zinc, the level is 300. This note is designed to be a "trigger" that allows enough time to either reduce the rate of application or find another field for application of biosolids and/or waste water. The CTL (critical toxic level) for Cu & Zn has been set at 3000 index; for peanuts with zinc, the level is 500. These levels are used by DENR as a benchmark to determine when application of waste products should be stopped. The CTL for copper and zinc was set to prevent levels from accumulating to the point where they become toxic to crops grown on a field.
This report contains both routine soil test information as well as heavy metals data in a section labeled as Heavy Metals under soil test lab results. Using Mehlich 3 as a soil test extractant, background levels of these metals typically seen in NC soils when analyzed are as follows: arsenic (As)- 4.5 ppm, cadmium (Cd)- 0.1 ppm, chromium (Cr)- 0.2 ppm, lead (Pb)- 4.2 ppm, nickel (Ni)- 0.8 ppm, & selenium (Se)- 0.2 ppm (FY2005-2007). (Note levels by sample if elevated signficantly as needed.)Although the above metals here are not believed to pose a concern for plant growth, continue to monitor these and note where elevated above background levels. This report was also flagged with a "C" and/or "Z" to alert you that copper and/or zinc have accumulated in the soil and are approaching a level that could be detrimental to crop production. The C and Z symbols are printed on your report for soil test index levels of 2000 or more; for peanuts with zinc, the level is 300. This note is designed to be a "trigger" that allows enough time to either reduce the rate of application or find another field for application of biosolids and/or waste water. The CTL (critical toxic level) for Cu & Zn has been set at 3000 index; for peanuts with zinc, the level is 500. These levels are used by DENR as a benchmark to determine when application of waste products should be stopped. The CTL for copper and zinc was set to prevent levels from accumulating to the point where they become toxic to crops grown on a field. Note any lime and fertilizer recommendations. Where soil test phosphorus (P) is very high (P-I > 100), crops will not respond to additional P applied. Tissue testing is advised where soil pH is elevated and where Zn and Cu levels are of concern as in samples found here.

Sample ID: 42051

Lime History:

Recommendations: Crop	Lime (tons/acre)	Nutrients (lb/acre) N	P_2O_5	K_2O	Mg	S	Mn	Zn	Cu	B	More Information
1 - Berm Hay/Pas,M	0.0	180-220	0	130	0	0	pH$	0	0	0	Note: 12 Note: $
2 - Small Grains	0.0	80-100	0	50	0	0	pH$	0	0	0	Note: 3 Note: $

Test Results [units - W/V in g/cm^3; CEC and Na in meq/100 cm^3; NO_3-N in mg/dm^3]: **Soil Class:** Mineral

HM%	W/V	CEC	BS%	Ac	pH	P-I	K-I	Ca%	Mg%	S-I	Mn-I	Mn-Al1	Mn-Al2	Zn-I	Zn-Al	Cu-I	Na	ESP	SS-I	NO_3-N
0.56	1.13	9.9	98	0.2	6.9	335	42	83	13	51	62	41	34	1523	1523	2315	0.1	1		

Heavy Metals (parts per million): **Arsenic,** 0.3 **Cadmium,** 0.2 **Nickel,** 0.3 **Chromium,** 0.2 **Lead,** 4.7 **Selenium,** 0.0

North Carolina
Tobacco Trust Fund Commission

Reprogramming of the laboratory-information-management system that makes this report possible is being funded through a grant from the North Carolina Tobacco Trust Fund Commission.

Thank you for using agronomic services to manage nutrients and safeguard environmental quality.
- *Steve Troxler, Commissioner of Agriculture*

Sample ID: 42052

Lime History:

Recommendations: Crop	Lime (tons/acre)	N	P_2O_5	K_2O	Mg	S	Mn	Zn	Cu	B	More Information
		Nutrients (lb/acre)									
1 - Berm Hay/Pas,M	0.0	180-220	0	160	0	0	pH$	0	0	0	Note: 12 Note: $
2 - Small Grains	0.0	80-100	0	70	0	0	pH$	0	0	0	Note: 3 Note: $

Test Results [units - W/V in g/cm^3; CEC and Na in meq/100 cm^3; NO_3-N in mg/dm^3]: **Soil Class:** Mineral

HM%	W/V	CEC	BS%	Ac	pH	P-I	K-I	Ca%	Mg%	S-I	Mn-I	Mn-AI1	Mn-AI2	Zn-I	Zn-AI	Cu-I	Na	ESP	SS-I	NO_3-N
0.51	1.16	10.3	100	0.0	7.0	299	32	87	12	50	55	34	27	1576	1576	1827	0.1	1		

Heavy Metals (parts per million): **Arsenic,** 0.3 **Cadmium,** 0.2 **Nickel,** 0.4 **Chromium,** 0.2 **Lead,** 3.4 **Selenium,** 0.0

Sample ID: 42053

Lime History:

Recommendations: Crop	Lime (tons/acre)	N	P_2O_5	K_2O	Mg	S	Mn	Zn	Cu	B	More Information
		Nutrients (lb/acre)									
1 - Berm Hay/Pas,M	0.0	180-220	0	170	0	0	pH$	0	0	0	Note: 12 Note: $
2 - Small Grains	0.0	80-100	0	90	0	0	$pH	0	0	0	Note: 3 Note: $

Test Results [units - W/V in g/cm^3; CEC and Na in meq/100 cm^3; NO_3-N in mg/dm^3]: **Soil Class:** Mineral

HM%	W/V	CEC	BS%	Ac	pH	P-I	K-I	Ca%	Mg%	S-I	Mn-I	Mn-AI1	Mn-AI2	Zn-I	Zn-AI	Cu-I	Na	ESP	SS-I	NO_3-N
0.51	1.19	9.5	100	0.0	7.2	267	26	87	11	54	52	30	23	1479	1479	1500	0.1	1		

Heavy Metals (parts per million): **Arsenic,** 0.3 **Cadmium,** 0.1 **Nickel,** 0.3 **Chromium,** 0.2 **Lead,** 3.3 **Selenium,** 0.2

Sample ID: 42054

Lime History:

Recommendations: Crop	Lime (tons/acre)	N	P_2O_5	K_2O	Mg	S	Mn	Zn	Cu	B	More Information
		Nutrients (lb/acre)									
1 - Berm Hay/Pas,M	0.0	180-220	0	160	0	0	pH$	0	0	0	Note: 12 Note: $
2 - Small Grains	0.0	80-100	0	70	0	0	pH$	0	0	0	Note: 3 Note: $

Test Results [units - W/V in g/cm^3; CEC and Na in meq/100 cm^3; NO_3-N in mg/dm^3]: **Soil Class:** Mineral

HM%	W/V	CEC	BS%	Ac	pH	P-I	K-I	Ca%	Mg%	S-I	Mn-I	Mn-AI1	Mn-AI2	Zn-I	Zn-AI	Cu-I	Na	ESP	SS-I	NO_3-N
0.56	1.20	6.0	97	0.2	6.8	154	32	81	13	36	51	35	28	551	551	598	0.1	2		

Heavy Metals (parts per million): **Arsenic,** 0.2 **Cadmium,** 0.1 **Nickel,** 0.2 **Chromium,** 0.2 **Lead,** 2.8 **Selenium,** 0.0

Understanding the Soil Report: explanation of measurements, abbreviations and units

Recommendations

Lime

If testing finds that soil pH is too low for the crop(s) indicated, a ***lime recommendation*** will be given in units of either ton/acre or lb/1000 sq ft. For best results, mix the lime into the top 6 to 8 inches of soil several months before planting. For no-till or established plantings where this is not possible, apply no more than 1 to 1.5 ton/acre (50 lb/1000 sq ft) at one time, even if the report recommends more. You can apply the rest in similar increments every six months until the full rate is applied. If MG is recommended and lime is needed, use dolomitric lime.

Fertilizer

Recommendations ***for field crops or other large areas*** are listed separately for each nutrient to be added (in units of lb/acre unless otherwise specified). Recommendations for N (and sometimes for B) are based on research/field studies for the crop being grown, not on soil test results. K-I and P-I values are based on test results and should be > 50. If they are not, follow the fertilizer recommendations given. If Mg is needed and no lime is recommended, 0-0-22 (11.5% Mg) is an excellent source; 175 to 250 lb per acre alone or in a fertilizer blend will usually satisfy crop needs, SS-I levels appear only on reports for greenhouse soil or problem samples.

Farmers and other commercial producers should pay special attention to ***micronutrient levels***. If *$*, *pH$*, *$pH*, *C* or *Z* notations appear on the soil report, refer to *$Note: Secondary Nutrients and Micronutrients*. In general, homeowners do not need to be concerned about micronutrients. Various crop notes also address lime fertilizer needs; visit ncagr.gov/agronomi/pubs.htm.

Recommendations ***for small areas, such as home lawns/gardens,*** are listed in units of lb/1000 ft . If you cannot find the exact fertilizer grade recommended on the report, visit *www.ncagr.gov/agronomi/obpart4.htm#fs* to find information that may help you choose a comparable alternate. For more information, read *A Homeowner's Guide to Fertilizer.*

Test Results

The first seven values [soil class, HM%, W/V, CEC, BS%, Ac and pH] describe the soil and its degree of acidity. The remaining 16 [P-I, K-I, Ca%, Mg%, Mn-I, Mn-AI1, Mn-AI2, Zn-I, Zn-AI, Cu-I, S-I, SS-I, Na, ESP, SS-I, NO_3-N (not routinely available)] indicate levels of plant nutrients or other fertility measurement. Visit *www.ncagr.gov/agronomi/uyrst.htm* for more information.

Report Abbreviations

Ac	exchangeable acidity
B	boron
BS%	% CEC occupied by basic cations
Ca%	% CEC occupied by calcium
CEC	cation exchange capacity
Cu-I	copper index
ESP	exchangeable sodium percent
HM%	percent humic matter
K-I	potassium index
K_2O	potash
Mg%	% CEC occupied by magnesium
MIN	mineral soil class
Mn	manganese
Mn-AI1	Mn-availability index for crop 1
Mn-AI2	Mn-availability index for crop 2
Mn-I	manganese index
M-O	mineral-organic soil class
N	nitrogen
Na	sodium
NO_3-N	nitrate nitrogen
ORG	organic soil class
pH	current soil pH
P-I	phosphorus index
P_2O_5	phosphate
S-I	sulfur index
SS-I	soluble salt index
W/V	weight per volume
Zn-AI	zinc availability index
Zn-I	zinc index