

## LOYD RAY FARMS INSPECTION, OPERATIONS & MAINTENANCE LOG SHEET

**IMPORTANT: AN INSPECTION, OPERATIONS & MAINTENANCE LOG SHOULD BE COMPLETED FOR EVERY SITE VISIT; PLEASE REVIEW PREVIOUS LOG ENTRY AND PROVIDE INFORMATION TO UPDATE OR RESOLVE ANY ONGOING ISSUES NOTED (INCLUDING BUT NOT LIMITED TO MAINTENANCE, REPAIRS, OR CORRECTIVE ACTIONS).**

Entry Made By: Marvin	Date: Thursday 12-20-2018	Remote monitor Start: 7:00 AM Site Visit start 10:30 AM	Remote Monitor End: 11:30PM Site Visit end 1:45 PM
Condition: Temperature 34 to 51 we are 44 at 1:30 PM	x <input type="checkbox"/> Cloudy and raining <input type="checkbox"/> Balmy		
Precip Last 24 Hrs. 0.3 inches and raining at 1:30PM	Wind: (mph): calm 5-8 mph		

### PURPOSE OF VISIT/ITEMS INSPECTED, OPERATIONS

Site visit to do a system check. I met with Bryan of ProPump and he installed fans and circuit boards in Phase converter. We restarted system and we are running. The Gravity Flare is off

### ENVIRONMENTAL SYSTEM OBSERVATIONS:

Equipment Observed:	Operational Status
Fluidyne Aeration System, Including:	
Jet Motive Pumps	<input checked="" type="checkbox"/> Auto <input type="checkbox"/> Hand On <input type="checkbox"/> Off <input type="checkbox"/> In Fault
Blower	<input checked="" type="checkbox"/> Auto <input type="checkbox"/> Hand On <input type="checkbox"/> Off <input type="checkbox"/> In Fault:
CP-1 (Control Panel)	<input checked="" type="checkbox"/> Auto <input type="checkbox"/> Hand On <input type="checkbox"/> Off <input type="checkbox"/> In Fault
Flush Pumps	<input type="checkbox"/> Auto <input checked="" type="checkbox"/> Hand On <input type="checkbox"/> Off <input type="checkbox"/> In Fault
Digester Mixing Pumps	<input checked="" type="checkbox"/> Auto <input type="checkbox"/> Hand On <input type="checkbox"/> Off <input type="checkbox"/> In Fault

### CP-1 DATA & SET POINTS;

Cycles	Set Point	Current	Modified Set Pt	Notes
Static	60	60		
Anoxic	90	90		
Aerobic	180	180		
Blower	<input type="checkbox"/> Continuous <input checked="" type="checkbox"/> Cycle			
Jet Motive Pumps	<input type="checkbox"/> Continuous <input checked="" type="checkbox"/> Both <input type="checkbox"/> Pump #1 <input type="checkbox"/> Pump # 2			
Digester Pumps	<input type="checkbox"/> Continuous <input checked="" type="checkbox"/> Both <input type="checkbox"/> Sequential			

### MOTOR DATA:

Aerobic	Run Time	Set Speed	Notes
Jet Motive Pump # 1		60Hz	

<b>Jet Motive Pump # 2</b>		<b>60Hz</b>	
<b>Blower</b>		<b>30Hz</b>	
<b>Anaerobic</b>			
<b>Mixing Pump 4A</b>		<b>60 Hz</b>	
<b>Mixing Pump 4B</b>		<b>60 Hz</b>	

**BIOGAS & POWER SYSTEMS OBSERVATIONS:**

<b>Equipment Observed:</b>	<b>Operational Status</b>				
<b>Unison Gas Skid</b>	Flow Rate	Total Flow	Comp. Press.	Outlet Press.	Gauge Press.
<i>Fault?</i> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	20.9				
<b>Microturbine</b>	Speed	Exit Temp	Inlet Pressure	Inlet Temp	Power Out
<i>Fault?</i> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	95852	1174		99	43.7 kw
<b>Biogas System</b>	BlueSens%	Flare On	Flare Flow	Total Flow	Flare Temp
		<input checked="" type="checkbox"/> Y <input type="checkbox"/> N	31.2	29.1	301

**UNISON GAS CONDITIONING LOG**

<b>Pressure Data</b>	<b>PIT 311</b> -5 to 10 inWC -0.1	<b>PIT 331</b> 88 to 110psig 97.39	<b>PIT 351</b> 88 to 110 psig 91.8	<b>Pressure Differential</b> <b>2.0</b>	<b>Panel Door</b>	<b>HM 331</b> Hours 7060	
<b>Temperature Data</b>	<b>TE 141</b> 32 to 45 F 35.1	<b>TE 311</b> 40 to 115 F 83.1	<b>TE 321</b> 35 to 75 F 46.6	<b>TE 331</b> 80 to 220 F 186.5	<b>TE 341</b> 33 to 45 F 35.2	<b>TE 342</b> 65 to 90 F 88.3	<b>TE 31</b> 35 to 115 F
<b>Glycol Piping</b>	<b>TI 141</b> 32 to 45 F	<b>PI 141</b> 35 to 52 psig	<b>FI 141</b> 2.5 to 3.5 gpm	<b>TI 142</b> 35 to 50 F	<b>PI 142</b> 33 to 50 psig	<b>TI 111</b> 38 to 52 F	<b>PI 111</b> 30 to 48 psig
<b>Oil Piping</b>	<b>PI 231</b> 90 to 110 psig	<b>TI 231</b> 178 to 215 F	<b>PI 232</b> 85 to 105 psig	<b>TI 232</b> 130 to 180 F	<b>PI 233</b> 80 to 100 psig	<b>TI 233</b> 168 to 185 F	<b>PI 234</b> 78 to 100psig
<b>Gas Piping</b>	<b>PIT 311</b> -10 to 10inWC	<b>TI 311</b> 40 to 115 F	<b>TI 321</b> 35 to 75 F	<b>PDI 321</b> 0 to 6 inWC	<b>PI 331</b> 90 to 110 psig	<b>TI 331</b> 80 to 220 F	<b>PI 332</b> 90 to 110psig
<b>Gas Piping</b>	<b>TI 341</b> 80 to 220 F	<b>PI 341</b> 90 to 110 psig	<b>TI 342</b> 115 to 155 F	<b>PI 342</b> 90 to 110 psig	<b>TE 343</b> 33 to 45 F	<b>PI 343</b> 90 to 110 psig	
<b>Gas Piping</b>	<b>TI 351</b> 65 to 90 F	<b>PI 351</b> 88 to 15 psig	<b>Check Indicators</b>	<b>LI 721</b>	<b>LI 231</b>	<b>LI 741</b>	

**PERSONNEL PRESENT:**

<b>Name</b>	<b>Affiliation</b>	<b>Phone Number/Email</b>

## LOYD RAY FARMS INSPECTION, OPERATIONS & MAINTENANCE LOG SHEET

**IMPORTANT: AN INSPECTION, OPERATIONS & MAINTENANCE LOG SHOULD BE COMPLETED FOR EVERY SITE VISIT; PLEASE REVIEW PREVIOUS LOG ENTRY AND PROVIDE INFORMATION TO UPDATE OR RESOLVE ANY ONGOING ISSUES NOTED (INCLUDING BUT NOT LIMITED TO MAINTENANCE, REPAIRS, OR CORRECTIVE ACTIONS).**

Entry Made By: Marvin	Date: Friday 12-21-2018	Remote monitor Start: 7:00 AM Site Visit start 11:30 AM	Remote Monitor End: 11:30PM Site Visit end 12:30 PM
Condition: Temperature 44 to 56 we are 56 at 12:30 PM	x <input type="checkbox"/> Cloudy and raining <input type="checkbox"/> Balmy		
Precip Last 24Hrs. 1.9 inches and shoers of and on at 12:30PM	Wind: (mph): calm 5-8 mph		

### PURPOSE OF VISIT/ITEMS INSPECTED, OPERATIONS

Site visit to do a system check. I met with Matt Arsenault of Duke U. We have been running solid since we replaced PC Fans yesterday. The Gravity Flare is off.

### ENVIRONMENTAL SYSTEM OBSERVATIONS:

Equipment Observed:	Operational Status
Fluidyne Aeration System, Including:	
Jet Motive Pumps	<input checked="" type="checkbox"/> Auto <input type="checkbox"/> Hand On <input type="checkbox"/> Off <input type="checkbox"/> In Fault
Blower	<input checked="" type="checkbox"/> Auto <input type="checkbox"/> Hand On <input type="checkbox"/> Off <input type="checkbox"/> In Fault:
CP-1 (Control Panel)	<input checked="" type="checkbox"/> Auto <input type="checkbox"/> Hand On <input type="checkbox"/> Off <input type="checkbox"/> In Fault
Flush Pumps	<input type="checkbox"/> Auto <input checked="" type="checkbox"/> Hand On <input type="checkbox"/> Off <input type="checkbox"/> In Fault
Digester Mixing Pumps	<input checked="" type="checkbox"/> Auto <input type="checkbox"/> Hand On <input type="checkbox"/> Off <input type="checkbox"/> In Fault

### CP-1 DATA & SET POINTS;

Cycles	Set Point	Current	Modified Set Pt	Notes
Static	60	60		
Anoxic	90	90		
Aerobic	180	180		
Blower	<input type="checkbox"/> Continuous <input checked="" type="checkbox"/> Cycle			
Jet Motive Pumps	<input type="checkbox"/> Continuous <input checked="" type="checkbox"/> Both <input type="checkbox"/> Pump #1 <input type="checkbox"/> Pump # 2			
Digester Pumps	<input type="checkbox"/> Continuous <input checked="" type="checkbox"/> Both <input type="checkbox"/> Sequential			

### MOTOR DATA:

Aerobic	Run Time	Set Speed	Notes
Jet Motive Pump # 1		60Hz	

<b>Jet Motive Pump # 2</b>		<b>60Hz</b>	
<b>Blower</b>		<b>30Hz</b>	
<b>Anaerobic</b>			
<b>Mixing Pump 4A</b>		<b>60 Hz</b>	
<b>Mixing Pump 4B</b>		<b>60 Hz</b>	

**BIOGAS & POWER SYSTEMS OBSERVATIONS:**

<b>Equipment Observed:</b>	<b>Operational Status</b>				
<b>Unison Gas Skid</b>	Flow Rate	Total Flow	Comp. Press.	Outlet Press.	Gauge Press.
<i>Fault?</i> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	20.9				
<b>Microturbine</b>	Speed	Exit Temp	Inlet Pressure	Inlet Temp	Power Out
<i>Fault?</i> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	95852	1174		99	43.7 kw
<b>Biogas System</b>	BlueSens%	Flare On	Flare Flow	Total Flow	Flare Temp
		<input checked="" type="checkbox"/> Y <input type="checkbox"/> N	31.2	29.1	301

**UNISON GAS CONDITIONING LOG**

<b>Pressure Data</b>	<b>PIT 311</b> -5 to 10 inWC -0.1	<b>PIT 331</b> 88 to 110psig 97.39	<b>PIT 351</b> 88 to 110 psig 91.8	<b>Pressure Differential</b> <b>2.0</b>	<b>Panel Door</b>	<b>HM 331</b> Hours 7060	
<b>Temperature Data</b>	<b>TE 141</b> 32 to 45 F 35.1	<b>TE 311</b> 40 to 115 F 83.1	<b>TE 321</b> 35 to 75 F 46.6	<b>TE 331</b> 80 to 220 F 186.5	<b>TE 341</b> 33 to 45 F 35.2	<b>TE 342</b> 65 to 90 F 88.3	<b>TE 31</b> 35 to 115 F
<b>Glycol Piping</b>	<b>TI 141</b> 32 to 45 F	<b>PI 141</b> 35 to 52 psig	<b>FI 141</b> 2.5 to 3.5 gpm	<b>TI 142</b> 35 to 50 F	<b>PI 142</b> 33 to 50 psig	<b>TI 111</b> 38 to 52 F	<b>PI 111</b> 30 to 48 psig
<b>Oil Piping</b>	<b>PI 231</b> 90 to 110 psig	<b>TI 231</b> 178 to 215 F	<b>PI 232</b> 85 to 105 psig	<b>TI 232</b> 130 to 180 F	<b>PI 233</b> 80 to 100 psig	<b>TI 233</b> 168 to 185 F	<b>PI 234</b> 78 to 100psig
<b>Gas Piping</b>	<b>PIT 311</b> -10 to 10inWC	<b>TI 311</b> 40 to 115 F	<b>TI 321</b> 35 to 75 F	<b>PDI 321</b> 0 to 6 inWC	<b>PI 331</b> 90 to 110 psig	<b>TI 331</b> 80 to 220 F	<b>PI 332</b> 90 to 110psig
<b>Gas Piping</b>	<b>TI 341</b> 80 to 220 F	<b>PI 341</b> 90 to 110 psig	<b>TI 342</b> 115 to 155 F	<b>PI 342</b> 90 to 110 psig	<b>TE 343</b> 33 to 45 F	<b>PI 343</b> 90 to 110 psig	
<b>Gas Piping</b>	<b>TI 351</b> 65 to 90 F	<b>PI 351</b> 88 to 15 psig	<b>Check Indicators</b>	<b>LI 721</b>	<b>LI 231</b>	<b>LI 741</b>	

**PERSONNEL PRESENT:**

<b>Name</b>	<b>Affiliation</b>	<b>Phone Number/Email</b>



## LOYD RAY FARMS INSPECTION, OPERATIONS & MAINTENANCE LOG SHEET

**IMPORTANT: AN INSPECTION, OPERATIONS & MAINTENANCE LOG SHOULD BE COMPLETED FOR EVERY SITE VISIT; PLEASE REVIEW PREVIOUS LOG ENTRY AND PROVIDE INFORMATION TO UPDATE OR RESOLVE ANY ONGOING ISSUES NOTED (INCLUDING BUT NOT LIMITED TO MAINTENANCE, REPAIRS, OR CORRECTIVE ACTIONS).**

Entry Made By: Marvin	Date: Sunday 12-30-2018	Remote monitor Start: 7:00 AM Site Visit start 2:00 PM	Remote Monitor End: 11:30PM Site Visit end 3:30 PM
Condition: Temperature 44 to 56	x <input type="checkbox"/> Cloudy and raining <input type="checkbox"/> Balmy		
Precip Last 24Hrs. 1.8 inches since 12-21-2018	Wind: (mph): calm 5-8 mph		

### PURPOSE OF VISIT/ITEMS INSPECTED, OPERATIONS

Site visit to do a system check The Gravity Flare is off. System was working but computer was down.

### ENVIRONMENTAL SYSTEM OBSERVATIONS:

Equipment Observed:	Operational Status
Fluidyne Aeration System, Including:	
Jet Motive Pumps	<input checked="" type="checkbox"/> Auto <input type="checkbox"/> Hand On <input type="checkbox"/> Off <input type="checkbox"/> In Fault
Blower	<input checked="" type="checkbox"/> Auto <input type="checkbox"/> Hand On <input type="checkbox"/> Off <input type="checkbox"/> In Fault:
CP-1 (Control Panel)	<input checked="" type="checkbox"/> Auto <input type="checkbox"/> Hand On <input type="checkbox"/> Off <input type="checkbox"/> In Fault
Flush Pumps	<input type="checkbox"/> Auto <input checked="" type="checkbox"/> Hand On <input type="checkbox"/> Off <input type="checkbox"/> In Fault
Digester Mixing Pumps	<input checked="" type="checkbox"/> Auto <input type="checkbox"/> Hand On <input type="checkbox"/> Off <input type="checkbox"/> In Fault

### CP-1 DATA & SET POINTS;

Cycles	Set Point	Current	Modified Set Pt	Notes
Static	60	60		
Anoxic	90	90		
Aerobic	180	180		
Blower	<input type="checkbox"/> Continuous <input checked="" type="checkbox"/> Cycle			
Jet Motive Pumps	<input type="checkbox"/> Continuous <input checked="" type="checkbox"/> Both <input type="checkbox"/> Pump #1 <input type="checkbox"/> Pump # 2			
Digester Pumps	<input type="checkbox"/> Continuous <input checked="" type="checkbox"/> Both <input type="checkbox"/> Sequential			

### MOTOR DATA:

Aerobic	Run Time	Set Speed	Notes
Jet Motive Pump # 1		60Hz	

<b>Jet Motive Pump # 2</b>		<b>60Hz</b>	
<b>Blower</b>		<b>30Hz</b>	
<b>Anaerobic</b>			
<b>Mixing Pump 4A</b>		<b>60 Hz</b>	
<b>Mixing Pump 4B</b>		<b>60 Hz</b>	

**BIOGAS & POWER SYSTEMS OBSERVATIONS:**

<b>Equipment Observed:</b>	<b>Operational Status</b>				
<b>Unison Gas Skid</b>	Flow Rate	Total Flow	Comp. Press.	Outlet Press.	Gauge Press.
<i>Fault?</i> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	20.9				
<b>Microturbine</b>	Speed	Exit Temp	Inlet Pressure	Inlet Temp	Power Out
<i>Fault?</i> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	95852	1174		99	43.7 kw
<b>Biogas System</b>	BlueSens%	Flare On	Flare Flow	Total Flow	Flare Temp
		<input checked="" type="checkbox"/> Y <input type="checkbox"/> N	31.2	29.1	301

**UNISON GAS CONDITIONING LOG**

<b>Pressure Data</b>	<b>PIT 311</b> -5 to 10 inWC -0.1	<b>PIT 331</b> 88 to 110psig 97.39	<b>PIT 351</b> 88 to 110 psig 91.8	<b>Pressure Differential</b> <b>2.0</b>	<b>Panel Door</b>	<b>HM 331</b> Hours 7060	
<b>Temperature Data</b>	<b>TE 141</b> 32 to 45 F 35.1	<b>TE 311</b> 40 to 115 F 83.1	<b>TE 321</b> 35 to 75 F 46.6	<b>TE 331</b> 80 to 220 F 186.5	<b>TE 341</b> 33 to 45 F 35.2	<b>TE 342</b> 65 to 90 F 88.3	<b>TE 31</b> 35 to 115 F
<b>Glycol Piping</b>	<b>TI 141</b> 32 to 45 F	<b>PI 141</b> 35 to 52 psig	<b>FI 141</b> 2.5 to 3.5 gpm	<b>TI 142</b> 35 to 50 F	<b>PI 142</b> 33 to 50 psig	<b>TI 111</b> 38 to 52 F	<b>PI 111</b> 30 to 48 psig
<b>Oil Piping</b>	<b>PI 231</b> 90 to 110 psig	<b>TI 231</b> 178 to 215 F	<b>PI 232</b> 85 to 105 psig	<b>TI 232</b> 130 to 180 F	<b>PI 233</b> 80 to 100 psig	<b>TI 233</b> 168 to 185 F	<b>PI 234</b> 78 to 100psig
<b>Gas Piping</b>	<b>PIT 311</b> -10 to 10inWC	<b>TI 311</b> 40 to 115 F	<b>TI 321</b> 35 to 75 F	<b>PDI 321</b> 0 to 6 inWC	<b>PI 331</b> 90 to 110 psig	<b>TI 331</b> 80 to 220 F	<b>PI 332</b> 90 to 110psig
<b>Gas Piping</b>	<b>TI 341</b> 80 to 220 F	<b>PI 341</b> 90 to 110 psig	<b>TI 342</b> 115 to 155 F	<b>PI 342</b> 90 to 110 psig	<b>TE 343</b> 33 to 45 F	<b>PI 343</b> 90 to 110 psig	
<b>Gas Piping</b>	<b>TI 351</b> 65 to 90 F	<b>PI 351</b> 88 to 15 psig	<b>Check Indicators</b>	<b>LI 721</b>	<b>LI 231</b>	<b>LI 741</b>	

**PERSONNEL PRESENT:**

<b>Name</b>	<b>Affiliation</b>	<b>Phone Number/Email</b>

## LOYD RAY FARMS INSPECTION, OPERATIONS & MAINTENANCE LOG SHEET

**IMPORTANT: AN INSPECTION, OPERATIONS & MAINTENANCE LOG SHOULD BE COMPLETED FOR EVERY SITE VISIT; PLEASE REVIEW PREVIOUS LOG ENTRY AND PROVIDE INFORMATION TO UPDATE OR RESOLVE ANY ONGOING ISSUES NOTED (INCLUDING BUT NOT LIMITED TO MAINTENANCE, REPAIRS, OR CORRECTIVE ACTIONS).**

Entry Made By: Marvin	Date: Monday 12-31-2018	Remote monitor Start: 7:00 AM Site Visit start 3:00 PM	Remote Monitor End: 11:30PM Site Visit end 5:15 PM
Condition: Temperature 44 to 56	x <input type="checkbox"/> Cloudy and raining <input type="checkbox"/> Balmy		
Precip Last 24Hrs. 0.7 inches	Wind: (mph): calm 5-8 mph		

### PURPOSE OF VISIT/ITEMS INSPECTED, OPERATIONS

Site visit to do a system check The Gravity Flare is off. System was working but computer was down again. Rebooted it again Checked Team Viewer with Nancy at home

### ENVIRONMENTAL SYSTEM OBSERVATIONS:

Equipment Observed:	Operational Status
Fluidyne Aeration System, Including:	
Jet Motive Pumps	<input checked="" type="checkbox"/> Auto <input type="checkbox"/> Hand On <input type="checkbox"/> Off <input type="checkbox"/> In Fault
Blower	<input checked="" type="checkbox"/> Auto <input type="checkbox"/> Hand On <input type="checkbox"/> Off <input type="checkbox"/> In Fault:
CP-1 (Control Panel)	<input checked="" type="checkbox"/> Auto <input type="checkbox"/> Hand On <input type="checkbox"/> Off <input type="checkbox"/> In Fault
Flush Pumps	<input type="checkbox"/> Auto <input checked="" type="checkbox"/> Hand On <input type="checkbox"/> Off <input type="checkbox"/> In Fault
Digester Mixing Pumps	<input checked="" type="checkbox"/> Auto <input type="checkbox"/> Hand On <input type="checkbox"/> Off <input type="checkbox"/> In Fault

### CP-1 DATA & SET POINTS;

Cycles	Set Point	Current	Modified Set Pt	Notes
Static	60	60		
Anoxic	90	90		
Aerobic	180	180		
Blower	<input type="checkbox"/> Continuous <input checked="" type="checkbox"/> Cycle			
Jet Motive Pumps	<input type="checkbox"/> Continuous <input checked="" type="checkbox"/> Both <input type="checkbox"/> Pump #1 <input type="checkbox"/> Pump # 2			
Digester Pumps	<input type="checkbox"/> Continuous <input checked="" type="checkbox"/> Both <input type="checkbox"/> Sequential			

### MOTOR DATA:

Aerobic	Run Time	Set Speed	Notes
Jet Motive Pump # 1		60Hz	
Jet Motive Pump # 2		60Hz	

<b>Blower</b>		<b>30Hz</b>	
<b>Anaerobic</b>			
<b>Mixing Pump 4A</b>		<b>60 Hz</b>	
<b>Mixing Pump 4B</b>		<b>60 Hz</b>	

**BIOGAS & POWER SYSTEMS OBSERVATIONS:**

<b>Equipment Observed:</b>	<b>Operational Status</b>				
<b>Unison Gas Skid</b> <i>Fault?</i> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Flow Rate	Total Flow	Comp. Press.	Outlet Press.	Gauge Press.
	20.9				
<b>Microturbine</b> <i>Fault?</i> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Speed	Exit Temp	Inlet Pressure	Inlet Temp	Power Out
	95852	1174		99	43.7 kw
<b>Biogas System</b>	BlueSens%	Flare On	Flare Flow	Total Flow	Flare Temp
		<input checked="" type="checkbox"/> Y <input type="checkbox"/> N	31.2	29.1	301

**UNISON GAS CONDITIONING LOG**

<b>Pressure Data</b>	<b>PIT 311</b> -5 to 10 inWC -0.1	<b>PIT 331</b> 88 to 110psig 97.39	<b>PIT 351</b> 88 to 110 psig 91.8	<b>Pressure Differential</b> <b>2.0</b>	<b>Panel Door</b>	<b>HM 331</b> Hours 7060	
<b>Temperature Data</b>	<b>TE 141</b> 32 to 45 F 35.1	<b>TE 311</b> 40 to 115 F 83.1	<b>TE 321</b> 35 to 75 F 46.6	<b>TE 331</b> 80 to 220 F 186.5	<b>TE 341</b> 33 to 45 F 35.2	<b>TE 342</b> 65 to 90 F 88.3	<b>TE 31</b> 35 to 115 F
<b>Glycol Piping</b>	<b>TI 141</b> 32 to 45 F	<b>PI 141</b> 35 to 52 psig	<b>FI 141</b> 2.5 to 3.5 gpm	<b>TI 142</b> 35 to 50 F	<b>PI 142</b> 33 to 50 psig	<b>TI 111</b> 38 to 52 F	<b>PI 111</b> 30 to 48 psig
<b>Oil Piping</b>	<b>PI 231</b> 90 to 110 psig	<b>TI 231</b> 178 to 215 F	<b>PI 232</b> 85 to 105 psig	<b>TI 232</b> 130 to 180 F	<b>PI 233</b> 80 to 100 psig	<b>TI 233</b> 168 to 185 F	<b>PI 234</b> 78 to 100psig
<b>Gas Piping</b>	<b>PIT 311</b> -10 to 10inWC	<b>TI 311</b> 40 to 115 F	<b>TI 321</b> 35 to 75 F	<b>PDI 321</b> 0 to 6 inWC	<b>PI 331</b> 90 to 110 psig	<b>TI 331</b> 80 to 220 F	<b>PI 332</b> 90 to 110psig
<b>Gas Piping</b>	<b>TI 341</b> 80 to 220 F	<b>PI 341</b> 90 to 110 psig	<b>TI 342</b> 115 to 155 F	<b>PI 342</b> 90 to 110 psig	<b>TE 343</b> 33 to 45 F	<b>PI 343</b> 90 to 110 psig	
<b>Gas Piping</b>	<b>TI 351</b> 65 to 90 F	<b>PI 351</b> 88 to 15 psig	<b>Check Indicators</b>	<b>LI 721</b>	<b>LI 231</b>	<b>LI 741</b>	

**PERSONNEL PRESENT:**

<b>Name</b>	<b>Affiliation</b>	<b>Phone Number/Email</b>

**APPENDIX B – Sample Collection Dataset (Digitally Attached)**

# Appendix B.

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# Wastewater Sample Reports

OFFICIAL COPY

Feb 26 2019

Kernersville, North Carolina 27284 18 September 2018

Cavanaugh & Associates  
530 N. Trade Street Ste 205  
Winston-Salem, NC 27101  
Attention: Kevin Harward/AP

TERMS: NET 30  
"PAST DUE INVOICES ACCRUE  
INTEREST AT 1 1/2 % INTEREST PER  
MONTH UNTIL PAID  
SHOULD COLLECTION BE REQUIRED,  
CUSTOMER AGREES TO PAY  
ALL EXPENSES INCURRED INCLUDING  
ATTORNEY'S FEES"

RE: \_\_\_\_\_

**RESEARCH & ANALYTICAL  
LABORATORIES, INC.**

Post Office Box 473

INVOICE NO. 15080M

Phone: 336/996-2841

Samples collected 08/17/18

TEST #	134	Copper, Tot	(01042)		
54900-01	54900-02	54900-03			
TOTAL	Copper, Tot	(01042)	ANALYSES 3	15.00	45.00
TEST #	192	Zinc, Tot	(01092)		
54900-01	54900-02	54900-03			
TOTAL	Zinc, Tot	(01092)	ANALYSES 3	15.00	45.00
TEST #	73	Phos, Tot	(00665)		
54900-01	54900-02	54900-03			
TOTAL	Phos, Tot	(00665)	ANALYSES 3	16.00	48.00
TEST #	81	TSS	(00530)		
54900-01	54900-02	54900-03			
TOTAL	TSS	(00530)	ANALYSES 3	15.00	45.00
TEST #	70	pH	(00400)		
54900-01	54900-02	54900-03			
TOTAL	pH	(00400)	ANALYSES 3	5.00	15.00
TEST #	10	Fec Coli-MPN	(31615)		
54900-01	54900-02	54900-03			
TOTAL	Fec Coli-MPN	(31615)	ANALYSES 3	16.00	48.00
TEST #	50	NH-3-N	(00610)		
54900-01	54900-02	54900-03			
TOTAL	NH-3-N	(00610)	ANALYSES 3	15.00	45.00
Analysis of three (3) samples for:					
Total Nitrogen					90.00
@ \$30.00/sample					
<b>TOTAL INVOICE</b>					<b>\$ 381.00</b>

OFFICIAL COPY

Feb 26 2019



# RESEARCH & ANALYTICAL LABORATORIES, INC.

## Report of Analysis

9/18/2018

**For: Cavanaugh & Associates**  
530 N. Trade Street, Suite 205  
Winston-Salem, NC 27101

**Attn: Marvin Cavanaugh**



OFFICIAL COPY  
Feb 26 2019

**Client Sample ID:** Influent  
**Site:** Cavanaugh & Assoc

**Lab Sample ID:** 54900-01  
**Collection Date:** 8/17/2018 10:30

<u>Parameter</u>	<u>Method</u>	<u>Result</u>	<u>Units</u>	<u>Rep Limit</u>	<u>Analyst</u>	<u>Analysis Date/Time</u>
Ammonia Nitrogen	SM 4500 NH3 D-1997	1170	mg/L	0.1	FK	9/6/2018
Copper, Total	EPA 200.7	0.714	mg/L	0.005	JF	8/22/2018
Fecal Coliform - MPN	SM 9221 C E-2006	>160000000	MPN/100ml	2	BJ	8/17/2018 1530
Nitrate + Nitrite	SM 4500 NO3 E-2000	0.357	mg/L	0.05	DW	9/11/2018
pH	SM 4500 H+B-2000	7.21	Std. Units		AP	8/17/2018 1641
Total Kjeldahl Nitrogen	SM 4500 N Org B (NH3 D-1997)	1340	mg/L	0.1	FK	9/10/2018
Total Nitrogen	Calc	1340	mg/L	1		
Total Phosphorous	SM 4500 P E-1999	142	mg/L	0.05	BJ	8/22/2018
Total Suspended Solids (TSS)	SM 2540 D-1997	1060	mg/L	5	AW	8/21/2018
Zinc, Total	EPA 200.7	4.41	mg/L	0.01	JF	8/22/2018

**Client Sample ID:** Digester  
**Site:** Cavanaugh & Assoc

**Lab Sample ID:** 54900-02  
**Collection Date:** 8/17/2018 10:40

<u>Parameter</u>	<u>Method</u>	<u>Result</u>	<u>Units</u>	<u>Rep Limit</u>	<u>Analyst</u>	<u>Analysis Date/Time</u>
Ammonia Nitrogen	SM 4500 NH3 D-1997	1890	mg/L	0.1	FK	9/6/2018
Copper, Total	EPA 200.7	15.1	mg/L	0.005	JF	8/22/2018
Fecal Coliform - MPN	SM 9221 C E-2006	460	MPN/100ml	2	BJ	8/17/2018 1530
Nitrate + Nitrite	SM 4500 NO3 E-2000	<0.05	mg/L	0.05	DW	9/11/2018
pH	SM 4500 H+B-2000	8.08	Std. Units		AP	8/17/2018 1644





# RESEARCH & ANALYTICAL LABORATORIES, INC.

## Report of Analysis

9/18/2018

Client Sample ID: Digester  
Site: Cavanaugh & Assoc

Lab Sample ID: 54900-02  
Collection Date: 8/17/2018 10:40

Parameter	Method	Result	Units	Rep Limit	Analyst	Analysis Date/Time
Total Kjeldahl Nitrogen	SM 4500 N Org B (NH3 D-1997)	2920	mg/L	0.1	FK	9/7/2018
Total Nitrogen	Calc	2460	mg/L	1		
Total Phosphorous	SM 4500 P E-1999	2460	mg/L	0.05	BJ	8/22/2018
Total Suspended Solids (TSS)	SM 2540 D-1997	50000	mg/L	5	AW	8/22/2018
Zinc, Total	EPA 200.7	103	mg/L	0.01	JF	8/22/2018

Client Sample ID: Effluent  
Site: Cavanaugh & Assoc

Lab Sample ID: 54900-03  
Collection Date: 8/17/2018 11:00

Parameter	Method	Result	Units	Rep Limit	Analyst	Analysis Date/Time
Ammonia Nitrogen	SM 4500 NH3 D-1997	689	mg/L	0.1	FK	9/6/2018
Copper, Total	EPA 200.7	0.088	mg/L	0.005	LP	8/29/2018
Fecal Coliform - MPN	SM 9221 C E-2006	1400000	MPN/100ml	2	BJ	8/17/2018 1530
Nitrate + Nitrite	SM 4500 NO3 E-2000	0.270	mg/L	0.05	DW	9/11/2018
pH	SM 4500 H+B-2000	8.23	Std. Units		AP	8/17/2018 1648
Total Kjeldahl Nitrogen	SM 4500 N Org B (NH3 D-1997)	1080	mg/L	0.1	FK	9/7/2018
Total Nitrogen	Calc	1080	mg/L	1		
Total Phosphorous	SM 4500 P E-1999	62.2	mg/L	0.05	BJ	8/22/2018
Total Suspended Solids (TSS)	SM 2540 D-1997	848	mg/L	5	AW	8/21/2018
Zinc, Total	EPA 200.7	0.489	mg/L	0.01	LP	8/29/2018

NA = not analyzed

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Feb 26 2019



# RESEARCH & ANALYTICAL LABORATORIES, INC.

Analytical / Process Consultations  
Phone (336) 996-2841

## CHAIN OF CUSTODY RECORD

COMPANY		JOB NO.		WATER / WASTEWATER										MISC.					
CAVANAUGH & ASSO. PA		LRF		2L G (BNA, Herb / Pest) 2 40ml Vials (NOA) HCL 250ml G (TOX) 250ml P (TOX) 1L P.G (TOC) H <sub>2</sub> O 1L G (BOD, TSS) 1L P.G (Phenol, Oil & Grease) 1L P.G (COD, N, P) 1L P.G (Metals, Hardness) Sterile P.G (CYANIDE) NaOH Sterile P.G (Coliform)															
STREET ADDRESS		PROJECT																	
530 N TRADEST SUITE 302		LRF																	
CITY, STATE, ZIP		SAMPLER NAME (PLEASE PRINT)																	
WILKINSON SALEM, NC 27101		MARVIN CAVANAUGH																	
CONTACT		SAMPLER SIGNATURE																	
MARVIN CAVANAUGH		[Signature]																	
PHONE																			
336 918 4204																			
SAMPLE NUMBER (LAB USE ONLY)	DATE	TIME	COMP	GRAB	TEMP °C	RES CI (mg/L)	CHLORINE REMOVED (Y or N)	SAMPLE MATRIX (S or W)	SAMPLE LOCATION / I.D.										REQUESTED ANALYSIS
5 SAMPLES	8/17/18	10:30 A						54900-01	INFLUENT										TOF N
5 SAMPLES	8/17/18	10:40 A						VL	DIGESTER										TK N
5 SAMPLES	8/17/18	11 AM						03	EFFLUENT										NO2 + NO3 PHOSPHORUS T NH-3-N FEC COLI COPPER T ZINC T TSS PH
RELINQUISHED BY		DATE/TIME		RECEIVED BY		REMARKS:													
[Signature]		8-17-18		[Signature]		SAMPLE TEMPERATURE AT RECEIPT 31 °C													
RELINQUISHED BY		DATE/TIME		RECEIVED BY															

**Research & Analytical Laboratories, Inc.**

PO Box 473  
Kernersville, NC 27285  
Phone 336.996.2841 Fax 336.996.0326  
Email: info@randalabs.com

**INVOICE**  
**15273M**

Date: December 27, 2018

**Bill To:**

Cavanaugh & Associates  
530 N. Trade Street, Suite 205  
Winston Salem, NC 27101

Attention: Accounts Payable

DESCRIPTION	AMOUNT
Project: LRF	
Samples collected: 11/20/18	
Analysis of three (3) samples for:	
Ammonia Nitrogen      \$20.00/sample	\$ 60.00
Copper, Total          \$20.00/sample	60.00
Fecal Coliform- MPN   \$20.00/sample	60.00
Nitrate + Nitrite      \$20.00/sample	60.00
PH                         \$10.00/sample	30.00
Total Kjeldahl Nitrogen \$20.00/sample	60.00
Total Phosphorous     \$20.00/sample	60.00
Total Suspended Solids \$15.00/sample	45.00
Zinc, Total               \$20.00/sample	60.00
<b>TOTAL INVOICE</b>	<b>\$ 495.00</b>

Make all checks payable to: **Research & Analytical Laboratories, Inc.**

**TERMS: NET 30**

"Past due invoices accrue interest at 1 1/2% interest per month until paid, should collection be required, customer agrees to pay all expenses incurred including attorney fees."

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Feb 26 2019



# RESEARCH & ANALYTICAL LABORATORIES, INC.

## Report of Analysis

12/20/2018

**For:** Cavanaugh & Associates  
530 N. Trade Street, Suite 205  
Winston-Salem, NC 27101

**Attn:** Kevin Harward



OFFICIAL COPY  
Feb 26 2019

**Client Sample ID:** Influent  
**Site:** Cavanaugh & Assoc

**Lab Sample ID:** 59394-01  
**Collection Date:** 11/20/2018 10:00

<u>Parameter</u>	<u>Method</u>	<u>Result</u>	<u>Units</u>	<u>Rep Limit</u>	<u>Analyst</u>	<u>Analysis Date/Time</u>
Ammonia Nitrogen	SM 4500 NH3 D-1997	1770	mg/L	0.1	FK	12/17/2018
Copper, Total	EPA 200.7	1.65	mg/L	0.1	SK	11/26/2018
Fecal Coliform - MPN	SM 9221 C E-2006	330000	MPN/100ml	2	BJ	11/20/2018 1710
Nitrate + Nitrite	SM 4500 NO3 E-2000	<0.05	mg/L	0.05	DW	11/27/2018
pH	SM 4500 H+B-2000	7.29	Std. Units		LP	11/20/2018 1550
Total Kjeldahl Nitrogen	SM 4500 N Org B (NH3 D-1997)	2430	mg/L	0.1	FK	12/17/2018
Total Nitrogen	Calc	2430	mg/L	0.1		
Total Phosphorous	SM 4500 P E-1999	481	mg/L	0.05	BJ	11/21/2018
Total Suspended Solids (TSS)	SM 2540 D-1997	3620	mg/L	5	LP	11/26/2018
Zinc, Total	EPA 200.7	9.64	mg/L	0.2	SK	11/26/2018

NA = not analyzed





# RESEARCH & ANALYTICAL LABORATORIES, INC.

## Report of Analysis

12/20/2018

**For:** Cavanaugh & Associates  
530 N. Trade Street, Suite 205  
Winston-Salem, NC 27101

**Attn:** Kevin Harward



OFFICIAL COPY

Feb 26 2019

**Client Sample ID:** Digester  
**Site:** Cavanaugh & Assoc

**Lab Sample ID:** 59394-02  
**Collection Date:** 11/20/2018 10:15

<u>Parameter</u>	<u>Method</u>	<u>Result</u>	<u>Units</u>	<u>Rep Limit</u>	<u>Analyst</u>	<u>Analysis Date/Time</u>
Ammonia Nitrogen	SM 4500 NH3 D-1997	2280	mg/L	0.1	FK	12/17/2018
Copper, Total	EPA 200.7	9.42	mg/L	0.1	SK	11/26/2018
Fecal Coliform - MPN	SM 9221 C E-2006	>1600000000	MPN/100ml	2	BJ	11/20/2018 1710
Nitrate + Nitrite	SM 4500 NO3 E-2000	0.056	mg/L	0.05	DW	11/27/2018
pH	SM 4500 H+B-2000	6.73	Std. Units		LP	11/20/2018 1553
Total Kjeldahl Nitrogen	SM 4500 N Org B (NH3 D-1997)	2900	mg/L	0.1	FK	12/17/2018
Total Nitrogen	Calc	2900	mg/L	0.1		
Total Phosphorous	SM 4500 P E-1999	1140	mg/L	0.05	BJ	11/21/2018
Total Suspended Solids (TSS)	SM 2540 D-1997	22900	mg/L	5	LP	11/26/2018
Zinc, Total	EPA 200.7	58.8	mg/L	0.2	SK	11/26/2018

NA = not analyzed



# RESEARCH & ANALYTICAL LABORATORIES, INC.

## Report of Analysis

12/20/2018

**For:** Cavanaugh & Associates  
530 N. Trade Street, Suite 205  
Winston-Salem, NC 27101

**Attn:** Kevin Harward



OFFICIAL COPY

Feb 26 2019

**Client Sample ID:** Effluent  
**Site:** Cavanaugh & Assoc

**Lab Sample ID:** 59394-03  
**Collection Date:** 11/20/2018 10:30

<u>Parameter</u>	<u>Method</u>	<u>Result</u>	<u>Units</u>	<u>Rep Limit</u>	<u>Analyst</u>	<u>Analysis Date/Time</u>
Ammonia Nitrogen	SM 4500 NH3 D-1997	702	mg/L	0.1	FK	12/17/2018
Copper, Total	EPA 200.7	0.334	mg/L	0.1	SK	11/26/2018
Fecal Coliform - MPN	SM 9221 C E-2006	33000000	MPN/100ml	2	BJ	11/20/2018 1710
Nitrate + Nitrite	SM 4500 NO3 E-2000	<0.05	mg/L	0.05	DW	11/27/2018
pH	SM 4500 H+B-2000	8.17	Std. Units		LP	11/20/2018 1555
Total Kjeldahl Nitrogen	SM 4500 N Org B (NH3 D-1997)	972	mg/L	0.1	FK	12/17/2018
Total Nitrogen	Calc	972	mg/L	0.1		
Total Phosphorous	SM 4500 P E-1999	215	mg/L	0.05	BJ	11/21/2018
Total Suspended Solids (TSS)	SM 2540 D-1997	1300	mg/L	5	LP	11/26/2018
Zinc, Total	EPA 200.7	2.32	mg/L	0.2	SK	11/26/2018

NA = not analyzed



# RESEARCH & ANALYTICAL LABORATORIES, INC.

Analytical / Process Consultations  
Phone (336) 996-2841

## CHAIN OF CUSTODY RECORD

COMPANY <i>Cavanaugh &amp; Assoc.</i>										JOB NO.																													
STREET ADDRESS <i>PO BOX 11197</i>										PROJECT <i>LRF</i>																													
CITY, STATE, ZIP <i>W-S NC 27116</i>										SAMPLER NAME (PLEASE PRINT) <i>Kevin Harvard</i>																													
CONTACT <i>Kevin Harvard</i>										PHONE <i>336-930-0162</i>																													
SAMPLER SIGNATURE <i>[Signature]</i>										NO. OF CONTAINERS																													
SAMPLE LOCATION / I.D.																																							
SAMPLE NUMBER (LAB USE ONLY)	DATE	TIME	COMP	GRAB	TEMP °C	RES Cl (mg/L)	CHLORINE REMOVED (Y or N)	SAMPLE MATRIX (S or W)	WATER / WASTEWATER										MISC.	REQUESTED ANALYSIS																			
<i>5939401</i>	<i>1/20/18</i>	<i>10:00</i>							<i>2L G (BNA, Herb / Pest)</i> <i>2 40ml Vials (NOA) HCL</i> <i>250ml G (TOX)</i> <i>250ml P (TOX)</i> <i>1L P.G (TOC) H<sub>2</sub>SO<sub>4</sub></i> <i>1L G (BOD, TSS)</i> <i>1L G (Phenol, Oil &amp; Grease)</i> <i>1L P.G (COD, N, P) H<sub>2</sub>SO<sub>4</sub></i> <i>1L P.G (Metals, Hardness)</i> <i>Sterile P.G (CYANIDE) NaOH</i> <i>Sterile P.G (Coliform)</i>											<i>Influent</i>	<i>4</i>	<i>Tot N</i>																	
<i>02</i>		<i>10:15</i>																									<i>TSS</i>												
<i>03</i>		<i>10:20</i>																									<i>NO<sub>2</sub> + NO<sub>3</sub></i>												
																		<i>Phosphorus T</i>																					
																		<i>NH<sub>3</sub>-N</i>																					
																		<i>Fec Coli</i>																					
																		<i>Copper T</i>																					
																		<i>Zinc T</i>																					
																		<i>TSS</i>																					
																		<i>pH</i>																					
RELINQUISHED BY <i>[Signature]</i>										DATE/TIME <i>1/20/18</i>										RECEIVED BY <i>[Signature]</i>										REMARKS: <i>smu</i>									
RELINQUISHED BY										DATE/TIME <i>1/18</i>										RECEIVED BY										SAMPLE TEMPERATURE AT RECEIPT <i>3.1 °C</i>									

# Appendix C.

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## Soil Sample Reports

OFFICIAL COPY

Feb 26 2019



Report No. FY19-SL009269

NCDA&CS Agronomic Division Phone: (919) 733-2655 Website: www.ncagr.gov/agronomi	Report No. FY19-SL009269 Client: Loyd Bryant Loyd Ray Farms Inc 2049 Center Rd. Boonville, NC 27011 Advisor: Sampled County : Yadkin Client ID: 205223 Advisor ID:
 <p><b>Predictive Home &amp; Garden                  Soil Report</b></p> <p>Mehlich-3 Extraction</p> <p><a href="#">Links to Helpful Information</a></p>	
Sampled: 10/22/2018 Received: 10/22/2018 Completed: 11/01/2018 Farm: 2094	
<p><b>Agronomist's Comments:</b></p> <p>This report provides Test Results and Recommendations for each sample submitted for testing. Look for Lime Recommendations and N-P-K Fertilizer Recommendations. The lime recommendation is always listed next to the first crop and will be based on the higher target pH if the pH targets for crop 1 and crop 2 differ. Application at the indicated rate will raise soil pH to the optimal level for the plant you specified and should be sufficient for 2 to 3 years, depending on soil type. Common target pH values are as follows: 5.0 for azalea, camellia, rhododendron and mt. laurel; 5.5 for centipedegrass; 6.0 for other lawn grasses, shrubbery, and; flowering plants; and 6.5 for vegetable gardens. N-P-K Recommendations are based on the nitrogen (N) needs of the plants being grown and the soil test results for phosphorus (P-I) and potassium (K-I); a 50 to 70 index for either is optimum. If the exact fertilizer cannot be found, find the closest match and adjust the rate accordingly. Refer to "Understanding the Soil Report" (last page of this report) for additional explanation and links to helpful information.</p>	
Sample ID: 2 Lime History: Loyd Bryant	<p><b>Lime Recommendations</b>                  Crop 1- Lawn (not centip.) 0.0 lb per 1,000 sq ft                  Crop 2- 0.0 lb per 1,000 sq ft</p> <p><b>Test Results:</b>                  pH = 7.1                  Optimum pH range 5.8 6.5 8.0</p> <p><b>N-P-K Fertilizer Recommendations*</b>                  5 lbs per 1000 sq ft 21-0-0 Group D</p> <p>Phosphorus Index (P-I) =87                  Potassium Index (K-I) =535</p> <p>Below Optimum Optimum Above Optimum</p> <p><i>*If you cannot find the fertilizer recommended here, choose one from the same Group (A, B, C or D) listed on the last page of this report.                  Note: This soil test does not measure nitrogen (N) levels. N fertilizer recommendations are based only on needs of the designated crop.</i></p>
Additional Test Results: Soil Class Mineral HM% 0.41 W/N 1.07 g/cm <sup>3</sup> CEC 10.7 meq/100 cm <sup>3</sup> Mn-I 153 Zn-I 616 Cu-I 147 S-I 36	



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

NCDA&CS Agronomic Division		Phone: (919) 733-2655	Website: <a href="http://www.ncagr.gov/agronomi">www.ncagr.gov/agronomi</a>	Report No. FY19-SL009269																
Page 2 of 6																				
Loyd Bryant																				
Sample ID: 4	<p><b>Lime Recommendations</b>                  Crop 1- Lawn (not centip.) 0.0 lb per 1,000 sq ft                  Crop 2- 0.0 lb per 1,000 sq ft</p> <p><b>N-P-K Fertilizer Recommendations *</b>                  5 lbs per 1000 sq ft 21-0-0 Group D</p>																			
<p><b>Lime History:</b></p> <p>Loyd Bryant</p> <p><b>Test Results:</b>                  pH = 7.1</p> <p>Optimum pH range: 5.8 - 6.5</p> <p>3.0 5.8 6.5 8.0</p>	<p><b>Phosphorus Index (P-I) =89</b></p> <p><b>Potassium Index (K-I) =539</b></p> <p>Below Optimum Optimum Above Optimum</p> <p><i>*If you cannot find the fertilizer recommended here, choose one from the same Group (A, B, C or D) listed on the last page of this report.                  Note: This soil test does not measure nitrogen (N) levels. N fertilizer recommendations are based only on needs of the designated crop.</i></p>																			
<p><b>Additional Test Results:</b></p> <table border="1"> <tr> <th>Soil Class</th> <th>HM%</th> <th>WW</th> <th>CEC</th> <th>Mn-I</th> <th>Zn-I</th> <th>Cu-I</th> <th>S-I</th> </tr> <tr> <td>Mineral</td> <td>0.41</td> <td>1.08 g/cm<sup>3</sup></td> <td>10.7 meq/100 cm<sup>3</sup></td> <td>150</td> <td>608</td> <td>141</td> <td>35</td> </tr> </table>	Soil Class	HM%	WW	CEC	Mn-I	Zn-I	Cu-I	S-I	Mineral	0.41	1.08 g/cm <sup>3</sup>	10.7 meq/100 cm <sup>3</sup>	150	608	141	35				
Soil Class	HM%	WW	CEC	Mn-I	Zn-I	Cu-I	S-I													
Mineral	0.41	1.08 g/cm <sup>3</sup>	10.7 meq/100 cm <sup>3</sup>	150	608	141	35													
Sample ID: 5	<p><b>Lime Recommendations</b>                  Crop 1- Lawn (not centip.) 0.0 lb per 1,000 sq ft                  Crop 2- 0.0 lb per 1,000 sq ft</p> <p><b>N-P-K Fertilizer Recommendations *</b>                  5 lbs per 1000 sq ft 21-0-0 Group D</p>																			
<p><b>Lime History:</b></p> <p>Loyd Bryant</p> <p><b>Test Results:</b>                  pH = 7.5</p> <p>Optimum pH range: 5.8 - 6.5</p> <p>3.0 5.8 6.5 8.0</p>	<p><b>Phosphorus Index (P-I) =116</b></p> <p><b>Potassium Index (K-I) =643</b></p> <p>Below Optimum Optimum Above Optimum</p> <p><i>*If you cannot find the fertilizer recommended here, choose one from the same Group (A, B, C or D) listed on the last page of this report.                  Note: This soil test does not measure nitrogen (N) levels. N fertilizer recommendations are based only on needs of the designated crop.</i></p>																			
<p><b>Additional Test Results:</b></p> <table border="1"> <tr> <th>Soil Class</th> <th>HM%</th> <th>WW</th> <th>CEC</th> <th>Mn-I</th> <th>Zn-I</th> <th>Cu-I</th> <th>S-I</th> </tr> <tr> <td>Mineral</td> <td>0.46</td> <td>1.10 g/cm<sup>3</sup></td> <td>12.1 meq/100 cm<sup>3</sup></td> <td>131</td> <td>1601</td> <td>128</td> <td>36</td> </tr> </table>	Soil Class	HM%	WW	CEC	Mn-I	Zn-I	Cu-I	S-I	Mineral	0.46	1.10 g/cm <sup>3</sup>	12.1 meq/100 cm <sup>3</sup>	131	1601	128	36				
Soil Class	HM%	WW	CEC	Mn-I	Zn-I	Cu-I	S-I													
Mineral	0.46	1.10 g/cm <sup>3</sup>	12.1 meq/100 cm <sup>3</sup>	131	1601	128	36													

NCDA&CS Agronomic Division		Phone: (919) 733-2655	Website: <a href="http://www.ncagr.gov/agronomi/">www.ncagr.gov/agronomi/</a>	Report No. FY19-SL009269																				
Page 3 of 6																								
Lloyd Bryant																								
Sample ID: 6	<p><b>Lime Recommendations</b>                  0.0 lb per 1,000 sq ft                  0.0 lb per 1,000 sq ft</p> <p><b>N-P-K Fertilizer Recommendations *</b>                  5 lbs per 1000 sq ft 21-0-0 Group D</p>																							
Lime History:	<p>Crop 1- Lawn (not censp.)                  Crop 2-</p> <p><b>Test Results:</b>                  pH = 7.2</p> <p>Optimum pH range</p> <table border="1"> <tr> <td>3.0</td> <td>5.8</td> <td>6.5</td> <td>8.0</td> </tr> </table> <p>Phosphorus Index (P-I) =90                  Potassium Index (K-I) =574</p> <p>Below Optimum Optimum Above Optimum</p> <p><i>*If you cannot find the fertilizer recommended here, choose one from the same Group (A, B, C or D) listed on the last page of this report.                  Note: This soil test does not measure nitrogen (N) levels. N fertilizer recommendations are based only on needs of the designated crop.</i></p>				3.0	5.8	6.5	8.0																
3.0	5.8	6.5	8.0																					
Additional Test Results:	<table border="1"> <tr> <td>CEC</td> <td>11.2</td> <td>Mn-I</td> <td>162</td> <td>Zn-I</td> <td>735</td> <td>Cu-I</td> <td>121</td> <td>SI</td> <td>35</td> </tr> <tr> <td>HM%</td> <td>0.41</td> <td>W/W</td> <td>1.04</td> <td>g/cm<sup>3</sup></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>				CEC	11.2	Mn-I	162	Zn-I	735	Cu-I	121	SI	35	HM%	0.41	W/W	1.04	g/cm <sup>3</sup>					
CEC	11.2	Mn-I	162	Zn-I	735	Cu-I	121	SI	35															
HM%	0.41	W/W	1.04	g/cm <sup>3</sup>																				
Sample ID: 7	<p><b>Lime Recommendations</b>                  0.0 lb per 1,000 sq ft                  0.0 lb per 1,000 sq ft</p> <p><b>N-P-K Fertilizer Recommendations *</b>                  5 lbs per 1000 sq ft 21-0-0 Group D</p>																							
Lime History:	<p>Crop 1- Lawn (not censp.)                  Crop 2-</p> <p><b>Test Results:</b>                  pH = 7.3</p> <p>Optimum pH range</p> <table border="1"> <tr> <td>3.0</td> <td>5.8</td> <td>6.5</td> <td>8.0</td> </tr> </table> <p>Phosphorus Index (P-I) =88                  Potassium Index (K-I) =595</p> <p>Below Optimum Optimum Above Optimum</p> <p><i>*If you cannot find the fertilizer recommended here, choose one from the same Group (A, B, C or D) listed on the last page of this report.                  Note: This soil test does not measure nitrogen (N) levels. N fertilizer recommendations are based only on needs of the designated crop.</i></p>				3.0	5.8	6.5	8.0																
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Additional Test Results:	<table border="1"> <tr> <td>CEC</td> <td>9.9</td> <td>Mn-I</td> <td>198</td> <td>Zn-I</td> <td>569</td> <td>Cu-I</td> <td>105</td> <td>SI</td> <td>32</td> </tr> <tr> <td>HM%</td> <td>0.51</td> <td>W/W</td> <td>1.07</td> <td>g/cm<sup>3</sup></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>				CEC	9.9	Mn-I	198	Zn-I	569	Cu-I	105	SI	32	HM%	0.51	W/W	1.07	g/cm <sup>3</sup>					
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Loyd Bryant Sample ID: 8	Crop 1- Lawn (not centip.) Crop 2- Test Results: pH = 7.3
Lime History: Loyd Bryant	Lime Recommendations 0.0 lb per 1,000 sq ft 0.0 lb per 1,000 sq ft Optimum pH range 3.0      5.8      6.5      8.0
Additional Test Results: Soil Class Mineral HM% 0.36 W/W 1.02 g/cm <sup>3</sup> CEC 11.4 meq/100 cm <sup>3</sup> Mn-I 166 Zn-I 696 Cu-I 114 S-I 33	N-P-K Fertilizer Recommendations* 5 lbs per 1000 sq ft 21-0-0 Group D Phosphorus Index (P-I) =91 Potassium Index (K-I) =618 Below Optimum      50      70      Optimum      Above Optimum *If you cannot find the fertilizer recommended here, choose one from the same Group (A, B, C or D) listed on the last page of this report. Note: This soil test does not measure nitrogen (N) levels. N fertilizer recommendations are based only on needs of the designated crop.
Sample ID: 9A	Crop 1- Lawn (not centip.) Crop 2- Test Results: pH = 6.8
Lime History: Loyd Bryant	Lime Recommendations 0.0 lb per 1,000 sq ft 0.0 lb per 1,000 sq ft Optimum pH range 3.0      5.8      6.5      8.0
Additional Test Results: Soil Class Mineral HM% 0.51 W/W 1.07 g/cm <sup>3</sup> CEC 9.0 meq/100 cm <sup>3</sup> Mn-I 222 Zn-I 475 Cu-I 108 S-I 32	N-P-K Fertilizer Recommendations* 5 lbs per 1000 sq ft 21-0-0 Group D Phosphorus Index (P-I) =85 Potassium Index (K-I) =334 Below Optimum      50      70      Optimum      Above Optimum *If you cannot find the fertilizer recommended here, choose one from the same Group (A, B, C or D) listed on the last page of this report. Note: This soil test does not measure nitrogen (N) levels. N fertilizer recommendations are based only on needs of the designated crop.

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Loyd Bryant	
Sample ID: 9C  Lime History:  Loyd Bryant	Crop 1- Lawn (not centip.) Crop 2-  Test Results: pH = 6.8  Optimum pH range 3.0    5.8    6.5    8.0
	Lime Recommendations 0.0 lb per 1,000 sq ft 0.0 lb per 1,000 sq ft
	N-P-K Fertilizer Recommendations * 5 lbs per 1000 sq ft 21-0-0 Group D  Phosphorus Index (P-I) = 83  Potassium Index (K-I) = 351  Below Optimum    Optimum    Above Optimum
Additional Test Results: Soil Class: Mineral HM%: 0.51 W/V: 1.10 g/cm <sup>3</sup> CEC: 8.8 meq/100 cm <sup>3</sup> Mn-I: 224 Zn-I: 445 Cu-I: 108 S-I: 29	*If you cannot find the fertilizer recommended here, choose one from the same Group (A, B, C or D) listed on the last page of this report. Note: This soil test does not measure nitrogen (N) levels. N fertilizer recommendations are based only on needs of the designated crop.

NCD&CS Agronomic Division      Phone: (919) 733-2655      Website: www.ncagr.gov/agronomi/	Report No.      FY19-SL009269																								
Loyd Bryant	Page 6 of 6																								
<b>Understanding the Soil Report</b>																									
<p><b>Lime</b>                  Application of lime at the recommended rate will raise soil pH to the optimum range. Do not apply too much lime. When soil pH becomes too high, lowering it is very difficult. Often, the best solution then is to choose plants that can tolerate a high pH.                  Choosing dolomitic lime can be advantageous because it contains the nutrients calcium and magnesium. Pelleted lime is easier to spread uniformly than powdered lime.                  Lime can be applied at any time of year, but because it reacts slowly, it is best to apply it several months before a new planting. Mixing it into the soil will speed the reaction time. Lime applied to the soil surface takes much longer to correct soil pH.                  A surface application should not exceed 60 lb per 1,000 sq ft. If a soil report recommends more than this, apply 60 lb per 1,000 sq ft initially and the rest in similar increments every 6-9 months until the full rate is applied.</p>	<p><b>Report Abbreviations</b>                  CEC      cation exchange capacity                  Cu-I      copper index                  HM%      percent humic matter                  Mn-I      manganese index                  pH      soil pH                  S-I      sulfur index                  SS-I      soluble salt index                  W/V      weight per volume                  Zn-I      zinc index</p>																								
<p><b>Fertilizer</b>                  Soil tests do not measure nitrogen (N) since it is very unstable in soils; the N recommendations provided on the soil report are based on plant needs. If soil-test P-I and K-I values are adequate (&gt;50), only nitrogen is recommended- Group D below. A mixed (N-P-K) fertilizer is recommended if P-I and K-I values are less than optimum- Groups A - C below. Although a specific fertilizer grade may be recommended (e.g., 5-10-10), other equivalent options are likely to be available (e.g., any fertilizer in Group A from Table 1).</p> <p><b>Tips on Fertilizer Application</b></p> <ul style="list-style-type: none"> <li>To determine how much fertilizer to buy, estimate (in feet) the length (L) and width (W) of the area to be treated: L x W = sq ft. Square off curves to make estimates easier. If the recommendation is 20 lb per 1,000 sq ft and your area is 5,000 sq ft, then you need 100 lb (20 x 5) for your 5,000-sq-ft area.</li> <li>Calibrate your spreader according to manufacturer settings. Apply half the total rate in one direction; apply the rest at a 90° angle. This cross-hair pattern provides a more uniform application.</li> <li>After application, sweep up any fertilizer on hard surfaces and apply to fertilized areas so rainfall does not carry fertilizer to a storm drain.</li> </ul>	<p><b>Time Fertilizer Application to Coincide with Plant Growth Cycle:</b>                  Bermudagrass: May, July, Sept                  Centpedegrass: May                  St. Augustine grass: May, August                  Tall fescue: Sept, Nov, Feb                  Zoysia: May, July                  Flowers/shrubs: prior to planting or during the growing season                  Vegetables: prior to planting</p>																								
<p><b>Table 1. Groups of equivalent fertilizers that supply 1 lb of N per 1,000 sq. ft.*</b></p> <table border="1"> <thead> <tr> <th>Group A: low P-I + low K-I</th> <th>Group B: low P-I + high K-I</th> <th>Group C: high P-I + low K-I</th> <th>Group D: N only</th> </tr> </thead> <tbody> <tr> <td>5-10-10 @ 20 lb</td> <td>5-10-5 @ 20 lb</td> <td>8-0-24 @ 12 lb</td> <td>15-0-0 @ 7 lb</td> </tr> <tr> <td>3-9-9 @ 30 lb</td> <td>18-46-0 @ 6 lb</td> <td>15-0-14 @ 7 lb</td> <td>21-0-0 @ 5 lb</td> </tr> <tr> <td>10-10-10 @ 10 lb</td> <td>18-24-10 @ 6 lb</td> <td>6-6-18 @ 18 lb</td> <td>16-0-0 @ 6 lb</td> </tr> <tr> <td>11-15-11 @ 10 lb</td> <td>9-13-7 @ 11 lb</td> <td>5-5-15 @ 20 lb</td> <td>28-0-4 @ 4 lb</td> </tr> <tr> <td>8-10-8 @ 12 lb</td> <td>9-17-8 @ 11 lb</td> <td>10-0-14 @ 10 lb</td> <td>12-6-6 @ 8 lb</td> </tr> </tbody> </table> <p>* Since these rates supply 1 lb N per 1,000 sq ft, use half the rate if centipede is the grass type.</p>	Group A: low P-I + low K-I	Group B: low P-I + high K-I	Group C: high P-I + low K-I	Group D: N only	5-10-10 @ 20 lb	5-10-5 @ 20 lb	8-0-24 @ 12 lb	15-0-0 @ 7 lb	3-9-9 @ 30 lb	18-46-0 @ 6 lb	15-0-14 @ 7 lb	21-0-0 @ 5 lb	10-10-10 @ 10 lb	18-24-10 @ 6 lb	6-6-18 @ 18 lb	16-0-0 @ 6 lb	11-15-11 @ 10 lb	9-13-7 @ 11 lb	5-5-15 @ 20 lb	28-0-4 @ 4 lb	8-10-8 @ 12 lb	9-17-8 @ 11 lb	10-0-14 @ 10 lb	12-6-6 @ 8 lb	<p><a href="#">A Homeowner's Guide to Fertilizer</a>  <a href="#">Note 4: Fertilization of Lawns, Gardens &amp; Ornamentals</a>  <a href="#">Caring for Your Lawn &amp; Environment</a>  <a href="#">Carolina Lawns</a>  <a href="#">Soil Acidity and Liming: Basic Information for Farmers &amp; Gardeners</a></p>
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Report No. FY19-SL009268

NCDA&CS Agronomic Division Phone: (919) 733-2655 Website: www.ncagr.gov/agronomi/	Report No. FY19-SL009268																																								
 <p><b>Predictive Home &amp; Garden</b>  <b>Soil Report</b></p> <p>Mehlich-3 Extraction</p> <p><a href="#">Links to Helpful Information</a></p>	Client: Loyd Bryant Loyd Ray Farms Inc 2049 Center Rd. Boonville, NC 27011 Sampled County : Yadkin Client ID: 205223 Advisor ID:																																								
Received: 10/22/2018 Completed: 11/01/2018 Farm: 2094	Agronomist's Comments: This report provides Test Results and Recommendations for each sample submitted for testing. Look for Lime Recommendations and N-P-K Fertilizer Recommendations. The lime recommendation is always listed next to the first crop and will be based on the higher target pH if the pH targets for crop 1 and crop 2 differ. Application at the indicated rate will raise soil pH to the optimal level for the plant you specified and should be sufficient for 2 to 3 years, depending on soil type. Common target pH values are as follows: 5.0 for azalea, camellia, rhododendron and mt. laurel; 5.5 for centipede grass, shrubbery, and; flowering plants; and 6.5 for vegetable gardens. N-P-K Recommendations are based on the nitrogen (N) needs of the plants being grown and the soil test results for phosphorus (P-I) and potassium (K-I); a 50 to 70 index for either is optimum. If the exact fertilizer cannot be found, find the closest match and adjust the rate accordingly. Refer to "Understanding the Soil Report" (last page of this report) for additional explanation and links to helpful information.																																								
Sample ID: 1A 01 Lime History: Loyd Bryant	<table style="width:100%; border-collapse: collapse;"> <tr> <td style="width:50%; border-right: 1px solid black;"> <table style="width:100%; border-collapse: collapse;"> <tr> <td style="border-bottom: 1px solid black;">Crop 1- Lawn (not centip.)</td> <td style="border-bottom: 1px solid black;">Lime Recommendations</td> </tr> <tr> <td style="border-bottom: 1px solid black;">Crop 2-</td> <td style="border-bottom: 1px solid black;">0.0 lb per 1,000 sq ft 0.0 lb per 1,000 sq ft</td> </tr> <tr> <td style="border-bottom: 1px solid black;">Test Results:</td> <td style="border-bottom: 1px solid black;">N-P-K Fertilizer Recommendations *</td> </tr> <tr> <td style="border-bottom: 1px solid black;">pH = 6.4</td> <td style="border-bottom: 1px solid black;">7 lbs per 1,000 sq ft 15-0-14 Group C</td> </tr> <tr> <td style="border-bottom: 1px solid black;">Optimum pH range</td> <td style="border-bottom: 1px solid black;">Phosphorus Index (P-I) =53</td> </tr> <tr> <td style="border-bottom: 1px solid black;">3.0 5.8 6.5 8.0</td> <td style="border-bottom: 1px solid black;">Potassium Index (K-I) =41</td> </tr> </table> </td> <td style="width:50%; vertical-align: top;"> <table style="width:100%; border-collapse: collapse;"> <tr> <td style="border-bottom: 1px solid black;">Additional Test Results:</td> <td style="border-bottom: 1px solid black;">Soil Class</td> <td style="border-bottom: 1px solid black;">HM%</td> <td style="border-bottom: 1px solid black;">W/V</td> <td style="border-bottom: 1px solid black;">CEC</td> <td style="border-bottom: 1px solid black;">Mn-I</td> <td style="border-bottom: 1px solid black;">Zn-I</td> <td style="border-bottom: 1px solid black;">Cu-I</td> <td style="border-bottom: 1px solid black;">S-I</td> </tr> <tr> <td style="border-bottom: 1px solid black;">Mineral</td> <td style="border-bottom: 1px solid black;">0.41</td> <td style="border-bottom: 1px solid black;">1.12</td> <td style="border-bottom: 1px solid black;">7.2</td> <td style="border-bottom: 1px solid black;">165</td> <td style="border-bottom: 1px solid black;">782</td> <td style="border-bottom: 1px solid black;">135</td> <td style="border-bottom: 1px solid black;">32</td> <td style="border-bottom: 1px solid black;">32</td> </tr> <tr> <td style="border-bottom: 1px solid black;">g/cm<sup>3</sup></td> <td style="border-bottom: 1px solid black;">meq/100 cm<sup>3</sup></td> <td colspan="6"></td> </tr> </table> </td> </tr> </table>	<table style="width:100%; border-collapse: collapse;"> <tr> <td style="border-bottom: 1px solid black;">Crop 1- Lawn (not centip.)</td> <td style="border-bottom: 1px solid black;">Lime Recommendations</td> </tr> <tr> <td style="border-bottom: 1px solid black;">Crop 2-</td> <td style="border-bottom: 1px solid black;">0.0 lb per 1,000 sq ft 0.0 lb per 1,000 sq ft</td> </tr> <tr> <td style="border-bottom: 1px solid black;">Test Results:</td> <td style="border-bottom: 1px solid black;">N-P-K Fertilizer Recommendations *</td> </tr> <tr> <td style="border-bottom: 1px solid black;">pH = 6.4</td> <td style="border-bottom: 1px solid black;">7 lbs per 1,000 sq ft 15-0-14 Group C</td> </tr> <tr> <td style="border-bottom: 1px solid black;">Optimum pH range</td> <td style="border-bottom: 1px solid black;">Phosphorus Index (P-I) =53</td> </tr> <tr> <td style="border-bottom: 1px solid black;">3.0 5.8 6.5 8.0</td> <td style="border-bottom: 1px solid black;">Potassium Index (K-I) =41</td> </tr> </table>	Crop 1- Lawn (not centip.)	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NCDA&CS Agronomic Division		Phone: (919) 733-2655	Website: www.ncagr.gov/agronomi/	Report No. FY19-SL009268	Page 2 of 5
Lloyd Bryant					
<b>Sample ID:</b> 1B 02  <b>Lime History:</b>  Lloyd Bryant		<b>Crop 1-</b> Lawn (not centip.) <b>Crop 2-</b> <b>Test Results:</b> pH = 6.4 		<b>Lime Recommendations</b> 0.0 lb per 1,000 sq ft 0.0 lb per 1,000 sq ft	
<b>Additional Test Results:</b> Soil Class Mineral HM% 0.41 W/W 1.15 g/cm <sup>3</sup> CEC 7.4 meq/100 cm <sup>3</sup> Mn-I 167 Zn-I 486 Cu-I 143 S-I 32		<b>N-P-K Fertilizer Recommendations*</b> 7 lbs per 1,000 sq ft 15-0-14 Group C  Phosphorus Index (P-I) =57 Potassium Index (K-I) =39  Below Optimum Optimum Above Optimum 			
*If you cannot find the fertilizer recommended here, choose one from the same Group (A, B, C or D) listed on the last page of this report. Note: This soil test does not measure nitrogen (N) levels. N fertilizer recommendations are based only on needs of the designated crop.					
<b>Sample ID:</b> 1C 03  <b>Lime History:</b>  Lloyd Bryant		<b>Crop 1-</b> Lawn (not centip.) <b>Crop 2-</b> <b>Test Results:</b> pH = 6.4 		<b>Lime Recommendations</b> 0.0 lb per 1,000 sq ft 0.0 lb per 1,000 sq ft	
<b>Additional Test Results:</b> Soil Class Mineral HM% 0.41 W/W 1.16 g/cm <sup>3</sup> CEC 7.6 meq/100 cm <sup>3</sup> Mn-I 172 Zn-I 443 Cu-I 137 S-I 32		<b>N-P-K Fertilizer Recommendations*</b> 7 lbs per 1,000 sq ft 15-0-14 Group C  Phosphorus Index (P-I) =56 Potassium Index (K-I) =41  Below Optimum Optimum Above Optimum 			
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Loyd Bryant Sample ID: 3A	N-P-K Fertilizer Recommendations* 5 lbs per 1000 sq ft 21-0-0 Group D Phosphorus Index (P-I) = 84 Potassium Index (K-I) = 474 Below Optimum      Optimum      Above Optimum *If you cannot find the fertilizer recommended here, choose one from the same Group (A, B, C or D) listed on the last page of this report. Note: This soil test does not measure nitrogen (N) levels. N fertilizer recommendations are based only on needs of the designated crop.
Lime History: Loyd Bryant	Lime Recommendations Crop 1- Lawn (not centip.)      0.0 lb per 1,000 sq ft Crop 2-      0.0 lb per 1,000 sq ft Test Results: pH = 7.2      Optimum pH range 3.0      5.8      6.5      8.0 Additional Test Results: Soil Class: Mineral HM%: 0.41      WV: 1.08 g/cm <sup>3</sup> CEC: 9.8 meq/100 cm <sup>3</sup> Mn-I: 119      Zn-I: 542      Cu-I: 102      S-I: 31
Loyd Bryant Sample ID: 3B	N-P-K Fertilizer Recommendations* 5 lbs per 1000 sq ft 21-0-0 Group D Phosphorus Index (P-I) = 91 Potassium Index (K-I) = 501 Below Optimum      Optimum      Above Optimum *If you cannot find the fertilizer recommended here, choose one from the same Group (A, B, C or D) listed on the last page of this report. Note: This soil test does not measure nitrogen (N) levels. N fertilizer recommendations are based only on needs of the designated crop.
Lime History: Loyd Bryant	Lime Recommendations Crop 1- Lawn (not centip.)      0.0 lb per 1,000 sq ft Crop 2-      0.0 lb per 1,000 sq ft Test Results: pH = 7.2      Optimum pH range 3.0      5.8      6.5      8.0 Additional Test Results: Soil Class: Mineral HM%: 0.36      WV: 1.10 g/cm <sup>3</sup> CEC: 9.4 meq/100 cm <sup>3</sup> Mn-I: 120      Zn-I: 492      Cu-I: 106      S-I: 32

NCDA&CS Agronomic Division		Phone: (919) 733-2655	Website: www.ncagr.gov/agronomi/	Report No. FY19-SL009268														
Loyd Bryant																		
Sample ID: 3C																		
Lime History:		<p>Crop 1- Lawn (not centip.)</p> <p>Crop 2-</p> <p><b>Test Results:</b></p> <p>pH = 7.0</p> <p>Optimum pH range</p>																
Loyd Bryant		<p><b>N-P-K Fertilizer Recommendations *</b></p> <p>5 lbs per 1000 sq ft 21-0-0 Group D</p> <p>Phosphorus Index (P-I) =92</p> <p>Potassium Index (K-I) =363</p> <p>Below Optimum Optimum Above Optimum</p> <p>*If you cannot find the fertilizer recommended here, choose one from the same Group (A, B, C or D) listed on the last page of this report.</p> <p>Note: This soil test does not measure nitrogen (N) levels. N fertilizer recommendations are based only on needs of the designated crop.</p>																
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Sample ID: 9B		<p><b>N-P-K Fertilizer Recommendations *</b></p> <p>5 lbs per 1000 sq ft 21-0-0 Group D</p> <p>Phosphorus Index (P-I) =86</p> <p>Potassium Index (K-I) =345</p> <p>Below Optimum Optimum Above Optimum</p> <p>*If you cannot find the fertilizer recommended here, choose one from the same Group (A, B, C or D) listed on the last page of this report.</p> <p>Note: This soil test does not measure nitrogen (N) levels. N fertilizer recommendations are based only on needs of the designated crop.</p>																
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Loyd Bryant	<p><b>Understanding the Soil Report</b></p> <p><u>Lime</u>                  Application of lime at the recommended rate will raise soil pH to the optimum range. Do not apply too much lime. When soil pH becomes too high, lowering it is very difficult. Often, the best solution then is to choose plants that can tolerate a high pH.                  Choosing dolomitic lime can be advantageous because it contains the nutrients calcium and magnesium. Pelleted lime is easier to spread uniformly than powdered lime.                  Lime can be applied at any time of year, but because it reacts slowly, it is best to apply it several months before a new planting. Mixing it into the soil will speed the reaction time. Lime applied to the soil surface takes much longer to correct soil pH.                  A surface application should not exceed 60 lb per 1,000 sq ft. If a soil report recommends more than this, apply 60 lb per 1,000 sq ft initially and the rest in similar increments every 6-9 months until the full rate is applied.</p> <p><u>Fertilizer</u>                  Soil tests do not measure nitrogen (N) since it is very unstable in soils; the N recommendations provided on the soil report are based on plant needs. If soil-test P-I and K-I values are adequate (&gt;50), only nitrogen is recommended- Group D below. A mixed (N-P-K) fertilizer is recommended if P-I and K-I values are less than optimum- Groups A - C below. Although a specific fertilizer grade may be recommended (e.g., 5-10-10), other equivalent options are likely to be available (e.g., any fertilizer in Group A from Table 1).</p> <p><u>Tips on Fertilizer Application</u></p> <ul style="list-style-type: none"> <li>To determine how much fertilizer to buy, estimate (in feet) the length (L) and width (W) of the area to be treated: L x W = sq ft. Square off curves to make estimates easier. If the recommendation is 20 lb per 1,000 sq ft and your area is 5,000 sq ft, then you need 100 lb (20 x 5) for your 5,000-sq-ft area.</li> <li>Calibrate your spreader according to manufacturer settings. Apply half the total rate in one direction; apply the rest at a 90° angle.</li> <li>This cross-hair pattern provides a more uniform application.</li> <li>After application, sweep up any fertilizer on hard surfaces and apply to fertilized areas so rainfall does not carry fertilizer to a storm drain.</li> </ul> <p><b>Table 1. Groups of equivalent fertilizers that supply 1 lb of N per 1,000 sq ft*</b></p> <table border="1"> <thead> <tr> <th>Group A: low P-I + low K-I</th> <th>Group B: low P-I + high K-I</th> <th>Group C: high P-I + low K-I</th> <th>Group D: N only</th> </tr> </thead> <tbody> <tr> <td>5-10-10 @ 20 lb</td> <td>5-10-5 @ 20 lb</td> <td>8-0-24 @ 12 lb</td> <td>15-0-0 @ 7 lb</td> </tr> <tr> <td>3-9-9 @ 30 lb</td> <td>18-46-0 @ 6 lb</td> <td>15-0-14 @ 7 lb</td> <td>21-0-0 @ 5 lb</td> </tr> <tr> <td>10-10-10 @ 10 lb</td> <td>18-24-10 @ 6 lb</td> <td>6-6-18 @ 18 lb</td> <td>16-0-0 @ 6 lb</td> </tr> <tr> <td>11-15-11 @ 10 lb</td> <td>9-13-7 @ 11 lb</td> <td>5-5-15 @ 20 lb</td> <td>28-0-4 @ 4 lb</td> </tr> <tr> <td>8-10-8 @ 12 lb</td> <td>9-17-8 @ 11 lb</td> <td>10-0-14 @ 10 lb</td> <td>12-6-6 @ 8 lb</td> </tr> </tbody> </table> <p>* Since these rates supply 1 lb N per 1,000 sq ft, use half the rate if centipede is the grass type.</p> <p><b>Report Abbreviations</b></p> <p>CEC      cation exchange capacity                  Cu-I      copper index                  HM%      percent humic matter                  Mn-I      manganese index                  pH      soil pH                  S-I      sulfur index                  SS-I      soluble salt index                  W/V      weight per volume                  Zn-I      zinc index</p> <p><b>Time Fertilizer Application to Coincide with Plant Growth Cycle:</b>                  Bermudagrass: May, July, Sept                  Centipedegrass: May                  St. Augustine grass: May, August                  Tall fescue: Sept, Nov, Feb                  Zoysia: May, July                  Flowers/shrubs: prior to planting or during the growing season                  Vegetables: prior to planting</p> <p><a href="#">A Homeowner's Guide to Fertilizer.</a>  <a href="#">Note 4: Fertilization of Lawns, Gardens &amp; Ornamentals.</a>  <a href="#">Caring for Your Lawn &amp; Environment.</a>  <a href="#">Carolina Lawns.</a>  <a href="#">Soil Acidity and Liming: Basic Information for Farmers &amp; Gardeners.</a></p>	Group A: low P-I + low K-I	Group B: low P-I + high K-I	Group C: high P-I + low K-I	Group D: N only	5-10-10 @ 20 lb	5-10-5 @ 20 lb	8-0-24 @ 12 lb	15-0-0 @ 7 lb	3-9-9 @ 30 lb	18-46-0 @ 6 lb	15-0-14 @ 7 lb	21-0-0 @ 5 lb	10-10-10 @ 10 lb	18-24-10 @ 6 lb	6-6-18 @ 18 lb	16-0-0 @ 6 lb	11-15-11 @ 10 lb	9-13-7 @ 11 lb	5-5-15 @ 20 lb	28-0-4 @ 4 lb	8-10-8 @ 12 lb	9-17-8 @ 11 lb	10-0-14 @ 10 lb	12-6-6 @ 8 lb
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