ATTACHMENT D.1.
VPA MONITORING REPORT
VPA01423

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Coles Point Wastewater TP

Month: April 2011
Report Date: 5-8-11

I hereby certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

The following attachments are included with this submittal:

(X) Attachment D.1- D.3 - Wastewater Monitoring (A daily operational log and any contractual lab certification sheets are required as an addendum to this report).	(1/Month)
( ) Attachment D.4 - Wastewater Monitoring	(1/5 Years)
(X) Attachments D.5 Land Application Monitoring	(1/Month)
(X) Attachments D.6 Soil Monitoring	(1/Year and 1/5 Year)
( ) Attachment D.7 Groundwater Monitoring	(1/Quarter)
( ) Attachment D.8 Groundwater Monitoring	(1/Year)
(X) Attachment D.9 Surfacewater Monitoring	(1/Quarter)
(X) Attachment D.10. Daily Freeboard Monitoring Log	(1/Month)

(X) Other Lab reports - Bench sheets - soil analysis reports Hydraulic Conductivity results

Coles Point Wastewater Treatment Plant
Westmoreland County
P.O. Box 1000
Montross, Va. 22520

GARY W FRANCE
Printed Name

Gary W France
Signature

Plant Operations
Title

5-8-11
Date

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ATTACHMENT D.2
VPA MONITORING REPORT
Location: Flow Meter
Wastewater Monitoring
This monitoring is required by VPA01423, Part I.A. Wastewater Influent to Storage Pond

Coles Point Wastewater TP

VPA01423

Year: April 2011

Parameter	Influent Flow (Avg.)	Influent Flow (Total)	Volume from Storage to each site	Volume in Storage	Remaining Storage Capacity	pH	TSS	BOD_5
Limits	NL	NL	NL	NL	NL	NL	60 mg/l	60 mg/l
Units	MGD	MG	MG	MG	MG	S.U.	mg/l	mg/l
Frequency	Continuous	Continuous	*********	1/Day	1/Day	1/Month	1/Month	1/Month
Sample Type	Measure	Recorded	From D.3	Calculated	Calculated	Grab	8 HC	8HC
Required Reporting	1/Month	1/Month	1/Month	1/Month	1/Month	1/Month	1/Month	1/Month
Month	**********	**********	Identify site(s):	**********	**********	**********	**********	**********
January								
February								
March								
April	10,720	321,610 1A	NO S1	62080	2917760	8.03	4.2	<3.0
May		1B	IRRIGATION S2	2979840	0			
June		2A	DURING S3	2490960	488880			
July		2B	THIS					
August		3A	PERIOD					
September		3B	"					
October								
November								
December								

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ATTACHMENT D.3
VPA MONITORING REPORT

Coles Point Wastewater TP Location: Storage Pond

Monitoring Required by VPA01423 Part 1A. Wastewater from Storage Pond to Spray Fields
*Requirement of the NMP which expires July 9, 2006
Effluent Monitoring: Monthly Parameters

VPA01423
Year: April 2011

Parameter	Total Kjeldahl Nitrogen (TKN)	Ammonia Nitrogen (NH_3-N)	Nitrate Nitrogen (NO_3-N)	Alkalinity	Storage Tank Freeboard	Total Potassium	pH	Total Sodium	Total Chloride	Total Boron	Total Phosphorus	Total Residual Chlorine (TRC)
Limits	NL	NL	NL	NL	2ft. min.	NL	NL	NL	NL	NL	NL	1.5 (min.)
Units	mg/l	mg/l	mg/l	mg/l	ft.	mg/l	S.U.	mg/l	mg/l	mg/l	mg/l	mg/l
Frequency	1/Month	1/Month	1/Month	1/Month	1/Day	1/Month	1/Day	1/Month	1/Month	2/Year	1/Month	1/Day
Sample Type	Grab	Grab	Grab	Grab	Measure	Grab	Grab	Grab	Grab	Grab	Grab	Grab
Required Reporting	Monthly	Monthly	Monthly	Monthly	Monthly	Monthy	Monthly	Monthly	Monthly	2/Year	Monthly	Monthly
Month	*******	**********	*********	**********	********	********	********	********	*******	*******	********	********
January										XXXXX		
February										XXXXX		
March										XXXXX		
April	2.04	1.47	1.81	249.4 S1	39.333'	29.2	8.33	102.0	88.4	0.42	3.20	N/A
May				S2	2'					XXXXX		
June				S3	7.25'					XXXXX		
July										XXXXX		
August										XXXXX		
September										XXXXX		
October												
November										XXXXX		
December										XXXXX		

Parameter	Calcium*	Mag-nesium*	% Moisture*
Units	mg/l	mg/l	%
Spring Month:			
Late Summer Month:			

N/A NO IRRIGATION EVENTS DURING THIS PERIOD

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ATTACHMENT D.5
VPA MONITORING REPORT
Location: Land Application Site
Land Application
This monitoring is required by VPA01423 Part I.A. Land Application Monitoring
*Requirement of the NMP which expires July 9, 2006

Coles Point Wastewater TP

VPA01423

Month/Year: April 2011

	Total Gallons Applied	in/hr	in/period	in/wk	Cumulative in/year	Nov through Feb. Cumulative Inches
Limit:	**********	0.25	1.0	2.0	20	5.9
Units:	gal.	in/hr	in/day	in/wk	in/yr	in/winter
Zone:						
1A						
1B						
2A	NO	IRRIGATION	EVENTS	DURING	THIS	PERIOD
2B						
3A						
3B						

	Effluent Plant Available Nitrogen (PAN) Applied	Other N Applied (Fertilizer, etc.)	Total PAN applied year to date	Effluent Phosphorus Applied	Other Phosphorus Applied (Fertilizer, etc.)	Effluent Phosphorus Applied Year to Date	Effluent Potassium Applied	Other Potassium Applied (Fertilizer, etc.)	Effluent Potassium Applied Year to Date
Limit	*********	**********	60 lb/a first year; 160 lb/a year 2-5; 30 lb/a Nov-Feb*	*******	********	*********	*********	*******	*******
Units	lb/acre	lb/acre	lb/acre	lb/acre	lb/acre	lb/acre	lb/acre	lb/acre	lb/acre
Zone: 1A									
1B									
2A	NO	IRRIGATION	EVENTS	DURING	THIS	PERIOD	"	"	
2B									
3A									
3B									

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ATTACHMENT D.6
VPA MONITORING REPORT
Location: Land Application Site
Soil Monitoring: Yearly and 1/5 Year Parameters
This monitoring is required b y VPA01423 Part I.A. Soil Monitoring

Coles Point Wastewater TP

VPA01423

ZONE 1

Year: April 2011

Parameter	Soil Organic Matter	Soil pH	Cation Exchange Capacity	Total Nitrogen	Organic Nitrogen	Ammonia Nitrogen	Available Phos-phorus	Exchange-able Potassium	Hydraulic Conductivity	Exchange-able Sodium	Exchange-able Calcium
Limits	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL
Units	%	Standard Units	meq/100g	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	in/hr	mg/100g	mg/100g
Sample Type	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	in situ	Composite	Composite
Required Reporting	Annually	Annually	Annually	Annually	Annually	Annually	Annually	Annually	Annually	Annually	Annually
Date	********	******	********	*********	*******	*********	********	********	*********	********	*********
	2.0	6.2	6.0	960	958.1	1.9	18	71	36.33282	17	6.0

Parameter	Exchange-able Magnesium	Textural Classification or USDA Particle Size Analysis	Total Re-coverable Chromium	Total Recov-erable Mang-anese	Total Recov-erable Copper	Total Recov-erable Nickel	Total Recov-erable Zinc	Total Recov-erable Cadmium	Total Recov-erable Lead
Limits	NL	NL	NL	NL	NL	NL	NL	NL	NL
Units	mg/100g	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Sample Type	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite
Required Reporting	Annually	1/5 years	1/5 Years	1/5 Years	1/5 Year	1/5 Year	1/5 Year	1/5 Year	1/5 Year
Date	********	*********	*********	********	********	*********	********	*********	*********
	125	DEPTH							

ATTACHMENT D.6
VPA MONITORING REPORT
Location: Land Application Site
Soil Monitoring: Yearly and 1/5 Year Parameters
This monitoring is required b y VPA01423 Part I.A. Soil Monitoring

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ZONE 2

Coles Point Wastewater TP

VPA01423

Year: April 2011

Parameter	Soil Organic Matter	Soil pH	Cation Exchange Capacity	Total Nitrogen	Organic Nitrogen	Ammonia Nitrogen	Available Phos-phorus	Exchange-able Potassium	Hydraulic Conductivity	Exchange-able Sodium	Exchange-able Calcium
Limits	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL
Units	%	Standard Units	meq/100g	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	in/hr	mg/100g	mg/100g
Sample Type	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	In situ	Composite	Composite
Required Reporting	Annually	Annually	Annually	Annually	Annually	Annually	Annually	Annually	Annually	Annually	Annually
Date	********	******	********	*********	*******	*********	********	********	*********	********	*********
	2.5	6.6	8.7	1530	1503.8	3.1	37	151	6.11.28405	43	1265

Parameter	Exchange-able Magnesium	Textural Classification or USDA Particle Size Analysis	Total Re-coverable Chromium	Total Recov-erable Mang-anese	Total Recov-erable Copper	Total Recov-erable Nickel	Total Recov-erable Zinc	Total Recov-erable Cadmium	Total Recov-erable Lead
Limits	NL	NL	NL	NL	NL	NL	NL	NL	NL
Units	mg/100g	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Sample Type	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite
Required Reporting	Annually	1/5 years	1/5 Years	1/5 Years	1/5 Year	1/5 Year	1/5 Year	1/5 Year	1/5 Year
Date	********	*********	*********	********	********	*********	********	*********	*********
	174	BEDIE							

ATTACHMENT D.6
VPA MONITORING REPORT
Location: Land Application Site
Soil Monitoring: Yearly and 1/5 Year Parameters
This monitoring is required b y VPA01423 Part I.A. Soil Monitoring

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#2 of 3

Coles Point Wastewater TP

VPA01423

Year: April 2011

Parameter	Soil Organic Matter	Soil pH	Cation Exchange Capacity	Total Nitrogen	Organic Nitrogen	Ammonia Nitrogen	Available Phos-phorus	Exchange-able Potassium	Hydraulic Conductivity	Exchange-able Sodium	Exchange-able Calcium
Limits	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL
Units	%	Standard Units	meq/100g	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	in/hr	mg/100g	mg/100g
Sample Type	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	In situ	Composite	Composite
Required Reporting	Annually	Annually	Annually	Annually	Annually	Annually	Annually	Annually	Annually	Annually	Annually
Date	********	******	********	*********	*******	*********	********	********	*********	********	*********
	2.5	6.3	7.9	1390	1382.1	2.9	43	95	-16.55448	41	956

Parameter	Exchange-able Magnesium	Textural Classification or USDA Particle Size Analysis	Total Re-coverable Chromium	Total Recov-erable Mang-anese	Total Recov-erable Copper	Total Recov-erable Nickel	Total Recov-erable Zinc	Total Recov-erable Cadmium	Total Recov-erable Lead
Limits	NL	NL	NL	NL	NL	NL	NL	NL	NL
Units	mg/100g	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Sample Type	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite
Required Reporting	Annually	1/5 years	1/5 Years	1/5 Years	1/5 Year	1/5 Year	1/5 Year	1/5 Year	1/5 Year
Date	********	********	*********	********	********	*********	********	*********	*********
	225	VFTotum							

ATTACHMENT D.6
VPA MONITORING REPORT
Location: Land Application Site
Soil Monitoring: Yearly and 1/5 Year Parameters
This monitoring is required b y VPA01423 Part I.A. Soil Monitoring

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Coles Point Wastewater TP

VPA01423

ZONE 4

Year: April 2011

Parameter	Soil Organic Matter	Soil pH	Cation Exchange Capacity	Total Nitrogen	Organic Nitrogen	Ammonia Nitrogen	Available Phos-phorus	Exchange-able Potassium	Hydraulic Conductivity	Exchange-able Sodium	Exchange-able Calcium
Limits	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL
Units	%	Standard Units	meq/100g	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	in/hr	mg/100g	mg/100g
Sample Type	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	In situ	Composite	Composite
Required Reporting	Annually	Annually	Annually	Annually	Annually	Annually	Annually	Annually	Annually	Annually	Annually
Date	********	******	********	*********	*******	*********	********	********	*********	********	*********
	2.4	5.9	10.6	1280	1277.7	2.3	77	129	5.55E-4 cm/s	102	1156

Parameter	Exchange-able Magnesium	Textural Classification or USDA Particle Size Analysis	Total Re-coverable Chromium	Total Recov-erable Mang-anese	Total Recov-erable Copper	Total Recov-erable Nickel	Total Recov-erable Zinc	Total Recov-erable Cadmium	Total Recov-erable Lead
Limits	NL	NL	NL	NL	NL	NL	NL	NL	NL
Units	mg/100g	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Sample Type	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite
Required Reporting	Annually	1/5 years	1/5 Years	1/5 Years	1/5 Year	1/5 Year	1/5 Year	1/5 Year	1/5 Year
Date	********	*********	*********	********	********	*********	********	*********	*********
	265	TEXTURE							

ATTACHMENT D.6
VPA MONITORING REPORT
Location: Land Application Site
Soil Monitoring: Yearly and 1/5 Year Parameters
This monitoring is required b y VPA01423 Part I.A. Soil Monitoring

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ZONE 5

Coles Point Wastewater TP

VPA01423

Year: April 2011

Parameter	Soil Organic Matter	Soil pH	Cation Exchange Capacity	Total Nitrogen	Organic Nitrogen	Ammonia Nitrogen	Available Phos-phorus	Exchange-able Potassium	Hydraulic Conductivity	Exchange-able Sodium	Exchange-able Calcium
Limits	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL
Units	%	Standard Units	meq/100g	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	in/hr	mg/100g	mg/100g
Sample Type	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	In situ	Composite	Composite
Required Reporting	Annually	Annually	Annually	Annually	Annually	Annually	Annually	Annually	Annually	Annually	Annually
Date	********	******	********	*********	*******	*********	********	********	*********	********	*********
	3.7	5.8	10.2	1640	1632.4	2.6	35	99	13.397625	85	1147

Parameter	Exchange-able Magnesium	Textural Classification or USDA Particle Size Analysis	Total Re-coverable Chromium	Total Recov-erable Mang-anese	Total Recov-erable Copper	Total Recov-erable Nickel	Total Recov-erable Zinc	Total Recov-erable Cadmium	Total Recov-erable Lead
Limits	NL	NL	NL	NL	NL	NL	NL	NL	NL
Units	mg/100g	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Sample Type	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite
Required Reporting	Annually	1/5 years	1/5 Years	1/5 Years	1/5 Year	1/5 Year	1/5 Year	1/5 Year	1/5 Year
Date	********	*********	*********	********	********	*********	********	*********	*********
	228	Relow							

ATTACHMENT D.6
VPA MONITORING REPORT
Location: Land Application Site
Soil Monitoring: Yearly and 1/5 Year Parameters
This monitoring is required b y VPA01423 Part I.A. Soil Monitoring

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ZONE 6

Coles Point Wastewater TP

VPA01423

Year: April 2011

Parameter	Soil Organic Matter	Soil pH	Cation Exchange Capacity	Total Nitrogen	Organic Nitrogen	Ammonia Nitrogen	Available Phos-phorus	Exchange-able Potassium	Hydraulic Conductivity	Exchange-able Sodium	Exchange-able Calcium
Limits	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL
Units	%	Standard Units	meq/100g	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	in/hr	mg/100g	mg/100g
Sample Type	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	in situ	Composite	Composite
Required Reporting	Annually	Annually	Annually	Annually	Annually	Annually	Annually	Annually	Annually	Annually	Annually
Date	********	******	********	*********	*******	*********	********	********	*********	********	*********
	3.5	6.3	12.2	1400	1396.9	3.1	88	182	23.5/1126	54	1585

Parameter	Exchange-able Magnesium	Textural Classification or USDA Particle Size Analysis	Total Re-coverable Chromium	Total Recov-erable Mang-anese	Total Recov-erable Copper	Total Recov-erable Nickel	Total Recov-erable Zinc	Total Recov-erable Cadmium	Total Recov-erable Lead
Limits	NL	NL	NL	NL	NL	NL	NL	NL	NL
Units	mg/100g	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Sample Type	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite
Required Reporting	Annually	1/5 years	1/5 Years	1/5 Years	1/5 Year	1/5 Year	1/5 Year	1/5 Year	1/5 Year
Date	********	*********	*********	********	********	*********	********	*********	*********
	271	STATE 2							

ATTACHMENT D.9
VPA MONITORING REPORT
Location: Surface Water Monitoring Sites
Surface Water Monitoring: Twice Yearly Parameters
These are required by VPA01423 Part I.A. Surfacewater Monitoring

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Coles Point Wastewater TP

VPA01423

Year: April 2011

Mon. Station SW-1

Parameter	pH	Chloride	Fecal Coliform	Total Kjeldahl Nitrogen	Nitrate Nitrogen (NO_3-N)	Ammonia Nitrogen (NH_3-N)	Con-ductivity	Sulfate	BOD_5	Total Phos-phorus
Limits	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL
Units	S.U.	mg/l	N/100 ml	mg/l	mg/l	mg/l	mHos	mg/l	mg/l	mg/l
Sample Type	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
Required Reporting	1/Quarter	1/Quarter	1/Quarter	1/Quarter	1/Quarter	1/Quarter	1/Quarter	1/Quarter	1/Quarter	1/Quarter
Date	******	*******	*******	********	********	********	******	*******	*********	********
January-March										
April-June	4.58	7.9	80	0.56	0.06	0.02	829	23.1	4.7	0.05
July-Sept										
Oct-Dec.										

ATTACHMENT D.9
VPA MONITORING REPORT
Location: Surface Water Monitoring Sites
Surface Water Monitoring: Twice Yearly Parameters
These are required by VPA01423 Part I.A. Surfacewater Monitoring

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Coles Point Wastewater TP

VPA01423

Year: April 2011

Mon. Station SW-2

Parameter	pH	Chloride	Fecal Coliform	Total Kjeldahl Nitrogen	Nitrate Nitrogen (NO_3-N)	Ammonia Nitrogen (NH_3-N)	Con-ductivity	Sulfate	BOD_5	Total Phos-phorus
Limits	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL
Units	S.U.	mg/l	N/100 ml	mg/l	mg/l	mg/l	mHos	mg/l	mg/l	mg/l
Sample Type	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
Required Reporting	1/Quarter	1/Quarter	1/Quarter	1/Quarter	1/Quarter	1/Quarter	1/Quarter	1/Quarter	1/Quarter	1/Quarter
Date	******	*******	*******	********	********	********	******	*******	*********	********
January-March										
April-June	5.05	20.5	8	<0.20	<0.01	0.02	530.0	449	5.4	0.06
July-Sept										
Oct-Dec.										

ATTACHMENT D.9
VPA MONITORING REPORT
Location: Surface Water Monitoring Sites
Surface Water Monitoring: Twice Yearly Parameters
These are required by VPA01423 Part I.A. Surfacewater Monitoring

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Coles Point Wastewater TP

VPA01423

Year: April 2011

Mon. Station SW-3

Parameter	pH	Chloride	Fecal Coliform	Total Kjeldahl Nitrogen	Nitrate Nitrogen (NO_3-N)	Ammonia Nitrogen (NH_3-N)	Con-ductivity	Sulfate	BOD_5	Total Phos-phorus
Limits	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL
Units	S.U.	mg/l	N/100 ml	mg/l	mg/l	mg/l	mHos	mg/l	mg/l	mg/l
Sample Type	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
Required Reporting	1/Quarter	1/Quarter	1/Quarter	1/Quarter	1/Quarter	1/Quarter	1/Quarter	1/Quarter	1/Quarter	1/Quarter
Date	******	*******	*******	********	********	********	******	*******	*********	********
January-March										
April-June	7.14	3637.9	300	0.3	0.10	0.06	16520.0	469.4	24	0.07
July-Sept										
Oct-Dec.										

Daily Freeboard Measurement Operational Log

Facility Name: Coles Point Wastewater Treatment
Permit #: VPA01423
Month: April 2
Year: 2011

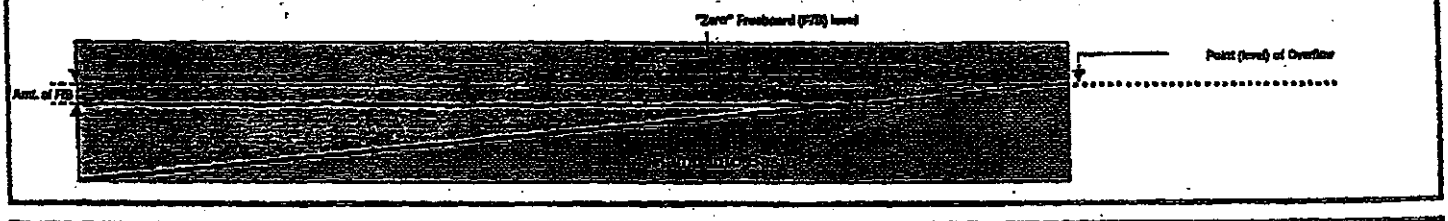
pH Method: Standard Methods 18th Edition 4500-H B and Manufacturer's Instructions
Freeboard Method: Ruler Measurement from calibrated 'Zero' freeboard point

VPA01423

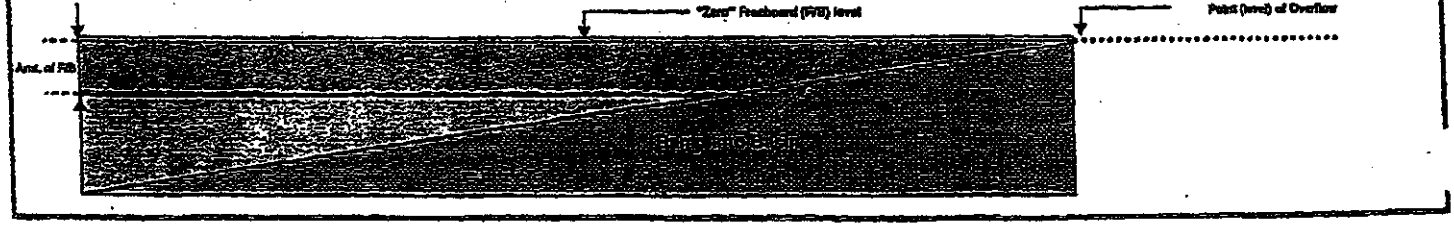
Date	Time	pH Meter Calibration Record actual buffer values Buffer 1	Buffer 2	Temp.	pH Sample Time	pH Analysis Time	Effluent pH S.U.	Initials	Freeboard (Inches) Basin 1	Basin 2	Basin 3	Volume in Storage 1	Volume in Storage 2	Volume in Storage 3	
1	0758	4.00	7.02	20.3	0810	0818	7.62	DCS	400"	24"	125"	8"	384"	283"	
2	0735	4.01	7.01	21.2	0820	0828	7.76	DCS	400"	24"	124"	8"	384"	284"	1
3	0735	4.01	7.01	22.8	0805	0815	7.38	DCS	400"	24"	122"	8"	384"	286	2
4	0740	4.00	7.01	21.1	0805	0815	7.45	DCS	400"	24"	120.5	8"	384"	287.5	1.5
5	0740	4.01	7.02	25.4	0808	0811	7.32	DCS	400"	24"	119.5	8"	384"	288.5	1
6	0735	4.01	7.00	24.7	0756	0759	7.33	S.C	400"	24"	118"	8"	384"	290"	1.5
7	0725	4.01	7.01	25.1	0747	0754	7.38	S.C	400"	24"	117"	8"	384"	291"	1
8	0735	4.00	7.01	21.6	0805	0808	7.20	DCS	400"	24"	115.5	8"	384"	292.5	1.5
9	0735	4.01	7.01	21.2	0810	0820	7.32	DCS	400"	24"	114	8"	384"	291"	1.5
10	0735	4.00	7.01	21.6	0807	0812	7.36	DCS	400"	24"	112	8"	384"	293"	2
11	0735	4.00	7.01	22.3	0800	0810	7.28	DCS	400"	24"	110.5	8"	384"	294.5	1.5
12	0805	4.01	7.00	25.4	0825	0833	7.47	DCS	400"	24"	109.5	8"	384"	295.5	1
13	0734	4.00	7.01	20.7	0745	0755	7.43	DCS	400"	24"	108.5	8"	384"	296.5	1
14	0728	4.00	7.02	19.7	0840	0852	7.43	DCS	400"	24"	107.5	8"	384"	297.5	1
15	0755	4.00	7.02	19.9	0540	0547	7.47	DCS	400"	24"	106.5	8"	384"	298.5	1
16	0800	4.00	7.01	20.9	0815	0820	7.63	DCS	400"	24"	105.5	8"	384"	299.5	1
17	0730	4.00	7.01	20.6	0808	0820	7.31	DCS	400"	24"	103.5	8"	384"	301.5	2
18	0745	4.00	7.01	20.6	0825	0835	7.33	DCS	400"	24"	101.5	8"	384"	304	2.5
19	1130	4.00	7.01	20.7	1145	1148	7.38	S.C	400"	24"	100	8"	384"	305.5	1.5
20	0730	4.01	7.01	23.2	0800	0810	7.07	DCS	400"	24"	99	8"	384"	306.5	1
21	0730	4.01	7.01	23.0	0820	0830	7.45	DCS	400"	24"	97.5	8"	384"	308	1.5
22	0800	4.00	7.02	19.8	0830	0838	7.50	DCS	400"	24"	95.5	8"	384"	310	2
23	0805	4.00	7.02	18.9	0840	0846	7.45	DCS	400"	24"	9[illegible].5	8"	384"	312.5	2.5
24	0743	4.01	7.01	22.9	0800	0815	7.31	DCS	400"	24"	94.5	8"	384"	313.5	2
25	0738	4.01	7.00	23.8	0805	0814	7.64	DCS	400"	24"	92.5	8"	384"	315.5	2
26	0740	4.01	7.00	23.8	0810	0820	7.24	DCS	400"	24"	91.5	8"	384"	316.5	1
27	0740	4.01	7.00	24.3	0825	0835	7.8	DCS	400"	24"	90.5	8"	384"	317.5	1
28	0750	4.01	7.00	24.2	0810	0825	7.44	DCS	400"	24"	89.5	8"	384"	318.5	1
29	0750	4.00	7.01	21.9	0820	0828	7.74	DCS	400"	24"	88.5	8"	384"	319.5	1
30	0755	4.00	7.01	20.8	0825	0831	7.68	DCS	400"	24"	87	8"	384"	321	1.5
31															
Minimum pH							7.07				IN	62080	2979840	2490960	
Maximum pH							7.76				RES	2917760	0	488880	
Minimum F/B									400"	24"	87"				

Note: "Freeboard" measurement is the vertical distance (inches) from the water level to the level at which wastewater will leave the settling basin.
Note: If the "Freeboard" is less than 24 inches, DEQ must immediately be notified, and a written statement of explanation and corrective measures is due within 5 days.

Cross-sectional view of Settling Basin - Example 1 (Basin side wall is higher than level of overflow)



Cross-sectional view of Settling Basin - Example 2 (Basin side wall is the point/level of overflow)



Coles Point Waste Treatment Facility

Daily Bench Sheet

														MONTH	YEAR	
			PH SM18 4500-H B		DO SM18 4500-O 1		CL2 SM20 4500-CL G							April	2011	
			SBR BASIN # 2				Chlorine Residual Sample			EFFLUENT SAMPLE				SETTLEABILITY %		
DAY	EFFLUENT TOTAL	DAILY +	TIME	Ph	DO	TEMP.	Cl2 RES.	Time Taken	Time Analyzed	Effluent PH	Effluent Temp	Time Taken	Time Analy	30 MIN SSV	60 MIN SSV	OPR
Pevious Day	43293180															
1	43301290	8,110	0810	7.15	4.45	12.7	1.64	0800	0815	7.62	8.3	0810	0818	89%	77%	DRB
2	43310940	9,650	0820	7.22	4.85	12.9	1.89	0820	0823	7.76	9.4	0820	0828	88%	76%	DRB
3	43324590	13,650	0755	7.10	5.21	12.5	1.52	0755	0758	7.28	9.5	0755	0805	82%	65%	DWA
4	43334920	10,330	0805	7.05	4.28	13.4	1.55	0805	0808	7.45	11.9	0805	0815	85%	70%	DWA
5	43342840	7,920	0808	7.02	2.38	15.1	1.51	0808	0811	7.33	16.2	0808	0817	78%	60%	DWA
6	43353970	11,130	0756	7.07	3.40	14.7	1.52	0756	0800	7.33	15.8	0756	0809	82%	63%	S.C
7	43361670	7,700	0747	7.11	3.62	14.9	1.55	0747	0750	7.38	15.7	0747	0758	78%	61%	S.C
8	43372130	10,460	0755	7.05	5.29	14.3	1.85	0755	0758	7.20	13.2	0755	0808	69%	48%	DWA
9	43384110	11,980	0810	6.99	4.50	13.9	2.07	0810	0813	7.32	12.7	0810	0820	60%	42%	DWA
10	43399660	15,550	0755	7.01	4.94	14.1	1.53	0755	0758	7.36	13.0	0755	0812	44%	38%	DWA
11	43410070	10,410	0800	6.99	4.03	15.0	1.51	0800	0803	7.28	14.6	0800	0810	52%	37%	DWA
12	43418370	8,300	0825	6.98	2.97	12.0	4.12	0825	0830	7.47	16.3	0825	0833	44%	35%	DRB
13	43425720	7,350	0745	7.03	3.41	15.9	3.96	0745	0748	7.43	14.4	0745	0805	44%	34%	DWA
14	43435290	9,570	0840	7.01	4.59	15.3	2.88	0840	0843	7.43	12.9	0840	0852	48%	36%	DWA
15	43441946	6,650	0840	7.15	4.89	15.6	4.24	0840	0844	7.47	13.1	0840	0847	39%	31%	DRB
16	43449350	7,410	0815	7.13	4.38	15.9	4.40	0815	0818	7.63	14.0	0815	0820	37%	31%	DRB
17	43466600	17,250	0808	6.76	0.85	15.1	3.20	0808	0811	7.31	13.3	0808	0820	38%	31%	DWA
18	43486400	19,800	0825	6.95	2.92	15.5	1.93	0825	0828	7.55	13.0	0825	0835	50%	39%	DWA
19	43498390	11,990	1145	7.02	3.63	15.9	1.87	1145	1148	7.38	13.6	1145	1155	48%	38%	S.C
20	43506660	8,270	0800	6.90	3.10	16.9	1.53	0800	0803	7.07	17.0	0800	0810	47%	35%	DWA
21	43518660	12,000	0820	6.92	2.67	16.9	1.56	0820	0823	7.45	13.9	0820	0830	36%	30%	DWA
22	43530320	11,660	0830	7.26	3.03	16.2	1.53	0830	0834	7.50	11.9	0830	0838	39%	32%	DRB
23	43541580	11,260	0840	7.05	2.83	15.8	1.79	0840	0844	7.45	13.1	0840	0846	40%	32%	DRB
24	43556390	14,810	0800	6.92	2.58	17.3	1.62	0800	0803	7.31	17.9	0800	0815	40%	32%	DWA
25	43570920	14,530	0805	6.95	2.35	18.1	1.58	0805	0808	7.64	18.9	0805	0814	45%	35%	DWA
26	43580010	9,090	0810	6.97	2.01	18.3	1.57	0810	0813	7.24	19.7	0810	0820	35%	30%	DWA
27	43588520	8,510	0825	6.94	2.54	19.6	1.74	0825	0828	7.19	20.0	0825	0835	39%	31%	DWA
28	43595340	6,820	0810	7.04	2.29	20.7	1.75	0830	1331	7.44	21.9	0810	0825	37%	30%	DWA
29	43604190	8,850	0820	7.30	3.17	19.4	4.40	0820	0825	7.74	13.1	0820	0828	38%	30%	DRB
30	43614790	10,600	0825	7.34	2.76	18.4	4.40	0825	0829	7.68	12.2	0825	0831	39%	31%	DRB
31																
										8:33	1111	1122	1125			

NOTE: PH TAKEN OF EFFLUENT SAMPLE FROM STORAGE TANK DURING MONTHLY TESTING

Monthly Total 321610 211.38

DIR 10,720.333 monthly 7,046

Primary Laboratories, Inc.

7423 Lee Davis Road • Mechanicsville, VA 23111 • Telephone (804) 559-9004 • Fax (804) 559-9306

ANALYTICAL LABORATORY REPORT

Westmoreland County
Attn: Gary France
P.O. Box 1000
Montross, Va. 22520

26-Apr-11

Project: Coles Point
Date Received: 13-Apr-11
Date Sampled: 13-Apr-11
Work Order No: 1104105-01
Client ID: **Plant Composite**

Test Description	Final Result	Reporting Limit	Units of Measure	Method Numbers*	Date Analyzed	Tech. Initials
TSS	4.2	1.0	mg/L	2540 D	14-Apr-11 at 10:00	HV
BOD	<3.0	3.0	mg/L	5210 B	15-Apr-11 at 10:15	NA

Date Sampled: 13-Apr-11
Work Order No: 1104105-02
Client ID: **Storage Tanks Grab**

Test Description	Final Result	Reporting Limit	Units of Measure	Method Numbers*	Date Analyzed	Tech. Initials
Alkalinity	249.4	1.0	mg/L as $CaCO_3$	2320 B	26-Apr-11 at 10:00	NA
Nitrate	1.81	0.10	mg/L	4500 NO_3^- E	14-Apr-11 at 12:00	NA
Total Phosphorus	2.70	0.10	mg/L	4500P E	20-Apr-11 at 15:00	NA
Ammonia	1.47	0.01	mg/L	4500NH_3 F	19-Apr-11 at 9:30	NA
Chloride	88.4	0.1	mg/L	4500CL G	19-Apr-11 at 15:00	NA
TKN	2.04	0.10	mg/L	4500 N/NH_3	21-Apr-11 at 9:30	NA

Primary Laboratories, Inc.
Results

26-Apr-11

Project: Coles Point
Date Received: 13-Apr-11
Date Sampled: 13-Apr-11
Work Order No: 1104105-02
Client ID: **Storage Tanks Grab**

Test Description	Final Result	Reporting Limit	Units of Measure	Method Numbers*	Date Analyzed	Tech. Initials
METALS						
Potassium	29.2	1.0	mg/L	EPA 200.2/3120B	15-Apr-11 at 14:22	HV
Sodium	172.0	10.0	mg/L	EPA 200.2/3120B	15-Apr-11 at 14:22	HV
Boron	0.62	0.10	mg/L	EPA 200.2/3120B	15-Apr-11 at 14:22	HV

* All methods are Standard Methods 18th Edition unless otherwise noted.

Signature: Parry L. Bragg Date: 4/26/11
Parry L. Bragg
Laboratory Manager

These analytical results are based upon materials provided by the client and are intended for the exclusive use of the client. These analytical results represent the best judgement of Primary Laboratories, Inc. Primary Laboratories, Inc. assumes no responsibility, express or implied, as to the interpretation of the analytical results contained in this report. This report is not to be reproduced except with the written approval of Primary Laboratories, Inc.

Primary Laboratories, Inc.

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ANALYTICAL LABORATORY REPORT

22-Apr-11

Westmoreland County
Attn: Gary France
P.O. Box 1000
Montross, Va. 22520

Project: Coles Point
Date Received: 13-Apr-11
Date Sampled: 13-Apr-11
Work Order No: 1104106-01
Client ID: **Surface Water #1**

Test Description	Final Result	Reporting Limit	Units of Measure	Method Numbers*	Date Analyzed	Tech. Initials
Fecal Coliform	80	2	MPN/100ml	9221E	13-Apr-11 at 15:30	HV
Specific Conductance	82.9	0.2	umhos/cm	2510 B	19-Apr-11 at 15:00	HV
pH	4.78	-	pH Units	4500H^+B	19-Apr-11 at 14:00	HV
BOD	4.7	3.0	mg/L	5210 B	15-Apr-11 at 10:15	NA
Nitrate	0.06	0.01	mg/L	4500 NO_3^-E	14-Apr-11 at 12:00	NA
Total Phosphorus	0.05	0.01	mg/L	4500P E	20-Apr-11 at 15:00	NA
Ammonia	0.02	0.01	mg/L	4500NH_3 F	19-Apr-11 at 9:30	NA
TKN	0.56	0.20	mg/L	4500 $N/_{NH3}$	21-Apr-11 at 9:30	NA
Chloride	7.9	0.1	mg/L	4500CL B	19-Apr-11 at 15:00	NA
Sulfate	23.1	2.0	mg/L	4500SO_4^{2}E	13-Apr-11 at 14:30	NA

Primary Laboratories, Inc.
Results

22-Apr-11

Project: Coles Point
Date Received: 13-Apr-11
Date Sampled: 13-Apr-11
Work Order No: 1104106-02
Client ID: **Surface Water #2**

Test Description	Final Result	Reporting Limit	Units of Measure	Method Numbers*	Date Analyzed	Tech. Initials
Fecal Coliform	8	2	MPN/100ml	9221E	13-Apr-11 at 15:30	HV
Specific Conductance	330.0	0.2	umhos/cm	2510 B	19-Apr-11 at 15:00	HV
pH	5.05	-	pH Units	$4500H^+B$	19-Apr-11 at 14:00	HV
BOD	5.4	3.0	mg/L	5210 B	15-Apr-11 at 10:15	NA
Nitrate	<0.01	0.01	mg/L	$4500\ NO_3^-E$	15-Apr-11 at 10:15	NA
Total Phosphorus	0.06	0.01	mg/L	4500P E	14-Apr-11 at 12:00	NA
Ammonia	0.02	0.01	mg/L	$4500NH_3\ F$	20-Apr-11 at 15:00	NA
TKN	<0.20	0.20	mg/L	$4500\ N/_{NH3}$	19-Apr-11 at 9:30	NA
Chloride	20.5	0.1	mg/L	4500CL B	21-Apr-11 at 9:30	NA
Sulfate	44.9	2.0	mg/L	$4500SO_4^{2}E$	19-Apr-11 at 14:30	NA

Primary Laboratories, Inc.
Results

22-Apr-11

Project: Coles Point
Date Received: 13-Apr-11
Date Sampled: 13-Apr-11
Work Order No: 1104106-03
Client ID: **Surface Water #3**

Test Description	Final Result	Reporting Limit	Units of Measure	Method Numbers*	Date Analyzed	Tech. Initials
Fecal Coliform	300	2	MPN/100ml	9221E	13-Apr-11 at 15:30	HV
Specific Conductance	16520.0	0.2	umhos/cm	2510 B	19-Apr-11 at 15:00	HV
pH	7.14	-	pH Units	4500H*B	19-Apr-11 at 14:00	HV
BOD	2.4	2.0	mg/L	5210 B	15-Apr-11 at 10:15	NA
Nitrate	0.10	0.01	mg/L	4500 NO_3 E	15-Apr-11 at 10:15	NA
Total Phosphorus	0.07	0.01	mg/L	4500P E	14-Apr-11 at 12:00	NA
Ammonia	0.06	0.01	mg/L	4500NH_3 F	20-Apr-11 at 15:00	NA
TKN	0.3	0.2	mg/L	4500 $N/_{NH3}$	19-Apr-11 at 9:30	NA
Chloride	3637.9	10.0	mg/L	4500CL B	21-Apr-11 at 9:30	NA
Sulfate	469.4	40.0	mg/L	4500SO_4^2E	19-Apr-11 at 14:30	NA

*All methods are from Standard Methods 18th Edition, unless otherwise noted.

Signature: _____ Date: 4-22-11
Parry L. Bragg
Laboratory Manager

These analytical results are based upon materials provided by the client and are intended for the exclusive use of the client. These analytical results represent the best judgement of Primary Laboratories, Inc. Primary Laboratories, Inc. assumes no responsibility, express or implied, as to the interpretation of the analytical results contained in this report. This report is not to be reproduced except with the written approval of Primary Laboratories, Inc.

Direct Dial (804) 550-9221
mwillinger@resourceintl.com
http://www.resourceintl.com

RESOURCE
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April 15, 2011

P.N. 204107.02

Mr. David Stoneman
Primary Laboratories, Inc.
7423 Lee Davis Road
Mechanicsville, Virginia 23111

RE: Hydraulic Conductivity Results
Coles Point Waste Water Treatment Plant

Dear Mr. Stoneman:

Resource scientists completed field testing of *in situ* hydraulic conductivity (K_{sat}) at the Coles Point Wastewater Treatment Plant on April 14, 2011. For each of the six spray application zones at the facility, a K_{sat} test was performed in a location representative of the zone being tested. The K_{sat} Data Sheets pertaining to this testing event are attached.

Please feel free to contact me if you have questions or comments regarding this information.

Regards,

Michael R. Willinger, P.G.
Project Geologist II

/aw

Enclosures

RESOURCE
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Ksat Data Sheet

Site Name: Coles Point WWTP
Resource P.N. 204107.02 3/510
Date: 14-Apr-11
Weather: Clear, Mid 70s
Personnel: Mike Willinger

Hole No. 1A

	inches	cm		inches	cm
Hole Depth:	18	45.72			
Initial depth to Water:	6.72	17.07	Initial depth of water in boring:	11.28	28.65
Final depth to water:	6.6	16.76	Final depth of water in boring:	11.40	28.96

Auger diameter: 3.25 8.255

	Clock time	Reservoir reading (cc)	Interval Change in Time (min)	Total Change in Time (min)	Interval Change in Volume (cc)	Total Change in Volume (cc)
1	15:29	1250	0	0	0	0
2	15:34	1270	5	5	20	20
3	15:39	1280	5	10	10	30
4	15:44	1280	5	15	0	30
5	15:49	1290	5	20	10	40
6	15:54	1300	5	25	10	50
7	15:59	1300	5	30	0	50
8	16:04	1300	5	35	0	50
9	16:09	1320	5	40	20	70
10	16:14	1340	5	45	20	90
11	16:19	1340	5	50	0	90
12	16:24	1360	5	55	20	110
13	16:29	1360	5	60	0	110
14	16:34	1360	5	65	0	110
15	16:39	1360	5	70	0	110
16						
17						

K= 36.332827 cm/day

K= (D7*((ASINH(D9/D8))-POWER((POWER(D8/D9,2)+1),0.5)+D8/D9)/2*(D10)*POWER(D9,2))/100

K= Q[sinh^-1(H/r) - {(r/H)^2 +1}^.5 +r/H]/2(3.14159)H^2

Q= 1.5714286 cc/min 110 cc/ 70 min.
r= 4.1275 cm
H= 28.80 cm
pi= 3.1415927

Q= total change in discharge from device after stabilization of discharge, divided by total time of readings
r= radius of auger hole, in cm
H= average height of water from bottom of auger hole, as measured during test.

Bertie

RESOURCE INTERNATIONAL, LTD.

Ksat Data Sheet

Site Name: Coles Point WWTP
Resource P.N. 204107.02 3/510
Date: 14-Apr-11
Weather: Clear, Low 70s
Personnel: Mike Willinger

Hole No. 1B

	inches	cm		inches	cm
Hole Depth:	18.5	46.99			
Initial depth to Water:	6.60	16.76	Initial depth of water in boring:	11.90	30.23
Final depth to water:	6.60	16.76	Final depth of water in boring:	11.90	30.23
Auger diameter:	3.25	8.255			

	Clock time	Reservoir reading (cc)	Interval Change in Time (min)	Total Change in Time (min)	Interval Change in Volume (cc)	Total Change in Volume (cc)
1	14:24	300	0	0	0	0
2	14:29	550	5	5	250	250
3	14:34	680	5	10	130	380
4	14:39	800	5	15	120	500
5	14:44	900	5	20	100	600
6	14:49	1020	5	25	120	720
7	14:54	1100	5	30	80	800
8	14:59	1210	5	35	110	910
9	15:04	1290	5	40	80	990
10	15:09	1390	5	45	100	1090
11	15:14	1490	5	50	100	1190
12	15:19	1590	5	55	100	1290
13						
14						
15						
16						
17						

K= 611.28475 cm/day

K= (D7*((ASINH(D9/D8))-POWER((POWER(D8/D9,2)+1),0.5)+D8/D9)/2*(D10)*POWER(D9,2))/100

K= Q[sinh^-1(H/r) - {(r/H)^2 +1}^.5 +r/H]/2(3.14159)H^2

Q= 23.454545 cc/min 1290 cc/ 55 min.
r= 4.1275 cm
H= 30.226 cm
pi= 3.1415927

Q= total change in discharge from device after stabilization of discharge, divided by total time of readings
r= radius of auger hole, in cm
H= average height of water from bottom of auger hole, as measured during test.

Bertie

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Ksat Data Sheet

Site Name: Coles Point WWTP
Resource P.N. 204107.02 3/510
Date: 14-Apr-11
Weather: Clear, Low 70s
Personnel: Mike Willinger

Hole No. 2A

	inches	cm		inches	cm
Hole Depth:	17.25	43.815			
Initial depth to Water:	6.60	16.76	Initial depth of water in boring:	10.65	27.05
Final depth to water:	5.64	14.33	Final depth of water in boring:	11.61	29.49

Auger diameter: 3.25 8.255

	Clock time	Reservoir reading (cc)	Interval Change in Time (min)	Total Change in Time (min)	Interval Change in Volume (cc)	Total Change in Volume (cc)
1	13:41	850	0	0	0	0
2	13:46	835	5	5	-15	-15
3	13:51	835	5	10	0	-15
4	13:56	835	5	15	0	-15
5	14:01	835	5	20	0	-15
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						

K= -16.551998 cm/day
K= (D7*((ASINH(D9/D8))-POWER((POWER(D8/D9,2)+1),0.5)+D8/D9)/2*(D10)*POWER(D9,2))/100

K= Q[sinh^-1(H/r) - {(r/H)^2 +1}^.5 +r/H]/2(3.14159)H^2

Q= -0.75 cc/min -15 cc/ 20 min.
r= 4.1275 cm
H= 28.2702 cm
pi= 3.14159265

Q= total change in discharge from device after stabilization of discharge, divided by total time of readings
r= radius of auger hole, in cm
H= average height of water from bottom of auger hole, as measured during test.

Note: There was water seeping into the boring at the beginning of the test. There was standing water in most areas of field 2A.

TE To Turn

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Ksat Data Sheet

Site Name: Coles Point WWTP
Resource P.N. 204107.02 3/510
Date: 14-Apr-11
Weather: Clear, Low 70s
Personnel: Mike Willinger

Hole No. 2B

	inches	cm
Hole Depth:	18	45.72
Initial depth to Water:	6.84	17.37
Final depth to water:	6.84	17.37
Auger diameter:	3.25	8.255

	inches	cm
Initial depth of water in boring:	11.16	28.35
Final depth of water in boring:	11.16	28.35

	Clock time	Reservoir reading (cc)	Interval Change in Time (min)	Total Change in Time (min)	Interval Change in Volume (cc)	Total Change in Volume (cc)
1	12:53	1175	0	0	0	0
2	12:58	1180	5	5	5	5
3	13:03	1180	5	10	0	5
4	13:08	1180	5	15	0	5
5	13:13	1180	5	20	0	5
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						

K= 5.554461 cm/day

K= (D7*((ASINH(D9/D8))-POWER((POWER(D8/D9,2)+1),0.5)+D8/D9)/2*(D10)*POWER(D9,2))/100

K= Q[sinh^-1(H/r) - {(r/H)^2 +1}^.5 +r/H]/2(3.14159)H^2

Q= 0.25 cc/min 5 cc/ 20 min.
r= 4.1275 cm
H= 28.35 cm
pi= 3.14159265

Q= total change in discharge from device after stabilization of discharge, divided by total time of readings
r= radius of auger hole, in cm
H= average height of water from bottom of auger hole, as measured during test.

TE To Tom

RESOURCE
INTERNATIONAL, LTD.

Ksat Data Sheet

Site Name: Coles Point WWTP
Resource P.N. 204107.02 3/510
Date: 14-Apr-11
Weather: Clear, Mid 60s
Personnel: Mike Willinger

Hole No. 3A

	inches	cm		inches	cm
Hole Depth:	17.5	44.45			
Initial depth to Water:	6.84	17.37	Initial depth of water in boring:	10.66	27.08
Final depth to water:	6.72	17.07	Final depth of water in boring:	10.78	27.38

Auger diameter: 3.25 8.255

	Clock time	Reservoir reading (cc)	Interval Change in Time (min)	Total Change in Time (min)	Interval Change in Volume (cc)	Total Change in Volume (cc)
1	12:04	1180	0	0	0	0
2	12:09	1190	5	5	10	10
3	12:14	1195	5	10	5	15
4	12:19	1200	5	15	5	20
5	12:24	1200	5	20	0	20
6	12:29	1200	5	25	0	20
7	12:34	1200	5	30	0	20
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						

K= 13.397625 cm/day
K= (D7*((ASINH(D9/D8))-POWER((POWER(D8/D9,2)+1),0.5)+D8/D9)/2*(D10)*POWER(D9,2))/100

K= Q[sinh^-1(H/r) - {(r/H)^2 +1}^.5 +r/H]/2(3.14159)H^2

Q= 0.67 cc/min 20 cc/ 30 min.
r= 4.1275 cm
H= 27.23 cm
pi= 3.1415927

Q= total change in discharge from device after stabilization of discharge, divided by total time of readings
r= radius of auger hole, in cm
H= average height of water from bottom of auger hole, as measured during test.

TETotum

RESOURCE
INTERNATIONAL, LTD.

Ksat Data Sheet

Site Name: Coles Point WWTP
Resource P.N. 204107.02 3/510

Date: 14-Apr-11
Weather: Clear, Mid 60s
Personnel: Mike Willinger

Hole No. 3B

	inches	cm		inches	cm
Hole Depth:	15	38.10			
Initial depth to Water:	6.84	17.37	Initial depth of water in boring:	8.16	20.73
Final depth to water:	6.72	17.07	Final depth of water in boring:	8.28	21.03

Auger diameter: 3.25 8.255

	Clock time	Reservoir reading (cc)	Interval Change in Time (min)	Total Change in Time (min)	Interval Change in Volume (cc)	Total Change in Volume (cc)
1	11:17	640	0	0	0	0
2	11:22	650	5	5	10	10
3	11:27	650	5	10	0	10
4	11:32	670	5	15	20	30
5	11:37	690	5	20	20	50
6	11:42	700	5	25	10	60
7	11:47	710	5	30	10	70
8	11:52	720	5	35	10	80
9						
10						
11						
12						
13						
14						
15						
16						
17						

K= **23.511126 cm/day**
K= (D7*((ASINH(D9/D8))-POWER((POWER(D8/D9,2)+1),0.5)+D8/D9)/2*(D10)*POWER(D9,2))/100

K= Q[sinh^-1(H/r) - {(r/H)^2 +1}^.5 +r/H]/2(3.14159)H^2

Q= 2.2857143 cc/min 80 cc/ 35 min.
r= 4.1275 cm
H= 20.88 cm
pi= 3.1415927

Q= total change in discharge from device after stabilization of discharge, divided by total time of readings
r= radius of auger hole, in cm
H= average height of water from bottom of auger hole, as measured during test.

STATE 1

Report Number: 11-109-0507
Account Number: 74017

A&L Eastern Laboratories, Inc.

7621 Whitepine Road Richmond, Virginia 23237 (804) 743-9401 Fax (804) 271-6448

www.aleastern.com

Send To: PRIMARY LABORATORIES
7423 LEE DAVIS RD
MECHANICSVILLE VA 23111

Grower: PLI

Submitted By: DAVID STONEMAN
Farm ID:

SOIL ANALYSIS REPORT

Analytical Method(s): Mehlich 3

Date Received: 04/19/2011 **Date Of Analysis:** 04/20/2011 **Date Of Report:** 04/22/2011

Sample ID Field ID	Lab Number	Organic Matter			Phosphorus				Potassium		Magnesium		Calcium		Sodium		pH		Acidity	C.E.C
					Mehlich 3		Reserve		K		Mg		Ca		Na		Soil	Buffer	H	
		%	Rate	ENR lbs/A	ppm	Rate	ppm	Rate	ppm	Rate	ppm	Rate	ppm	Rate	ppm	Rate	pH	Index	meq/100g	meq/100g
#6	08891	3.5	M	103	88	H			182	H	271	H	1585	M	54	VL	6.3	6.80	1.3	12.2
#5	08892	3.7	M	109	35	M			97	L	228	H	1147	M	85	L	5.8	6.74	1.9	10.2
#4	08893	2.4	L	83	77	H			129	M	265	H	1158	M	102	M	5.9	6.75	1.8	10.6
#3	08894	2.5	L	89	43	M			95	M	225	H	956	M	41	L	6.3	6.85	0.8	7.9
#2	08895	2.5	L	87	37	M			151	H	174	H	1265	H	43	L	6.8	6.88	0.5	8.9

Sample ID Field ID	Percent Base Saturation					Nitrate	Sulfur	Zinc	Manganese	Iron	Copper	Boron	Soluble Salts	Chloride	Aluminum
	K %	Mg %	Ca %	Na %	H %	NO_3N ppm Rate	S ppm Rate	Zn ppm Rate	Mn ppm Rate	Fe ppm Rate	Cu ppm Rate	B ppm Rate	SS ms/cm Rate	Cl ppm Rate	Al ppm
#6	3.8	18.5	65.0	1.9	10.5	7									
#5	2.4	18.6	56.2	3.6	19.0	6									
#4	3.1	20.8	54.5	4.2	17.1	2									
#3	3.1	23.7	60.5	2.3	10.6	4									
#2	4.4	16.3	71.1	2.1	5.9	9									

Values on this report represent the plant available nutrients in the soil. Rating after each value: VL (Very Low), L (Low), M (Medium), H (High), VH (Very High). ENR - Estimated Nitrogen Release. C.E.C. - Cation Exchange Capacity.

Explanation of symbols: % (percent), ppm (parts per million), lbs/A (pounds per acre), ms/cm (milli-mhoe per centimeter), meq/100g (milli-equivalent per 100 grams). Conversions: ppm x 2 = lbs/A, Soluble Salts ms/cm x 640 = ppm.

This report applies to sample(s) tested. Samples are retained a maximum of thirty days after testing.

Analysis prepared by: A&L Eastern Laboratories, Inc.

by: Pauric McGroery

Pauric McGroery

Report Number: 11-109-0507
Account Number: 74017

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A&L Eastern Laboratories, Inc.

7521 Whitepine Road Richmond, Virginia 23237 (804) 743-9401 Fax (804) 271-6446

Send To: PRIMARY LABORATORIES
7423 LEE DAVIS RD
MECHANICSVILLE VA 23111

Grower: PLI

Submitted By: DAVID STONEMAN
Farm ID:

SOIL ANALYSIS REPORT

Analytical Method(s): Mehlich 3

Date Received: 04/19/2011 **Date Of Analysis:** 04/20/2011 **Date Of Report:** 04/22/2011

Sample ID Field ID	Lab Number	Organic Matter			Phosphorus				Potassium		Magnesium		Calcium		Sodium		pH		Acidity	C.E.C
		%	Rate	ENR lbs/A	Mehlich 3 ppm	Rate	Reserve ppm	Rate	K ppm	Rate	Mg ppm	Rate	Ca ppm	Rate	Na ppm	Rate	Soil pH	Buffer Index	H meq/100g	meq/100g
#1	08897	2.0	L	81	18	L			71	L	123	H	803	M	17	VL	6.2	6.86	0.7	6.0

Sample ID Field ID	Percent Base Saturation					Nitrate		Sulfur		Zinc		Manganese		Iron		Copper		Boron		Soluble Salts		Chloride		Aluminum
	K %	Mg %	Ca %	Na %	H %	NO_3N ppm	Rate	S ppm	Rate	Zn ppm	Rate	Mn ppm	Rate	Fe ppm	Rate	Cu ppm	Rate	B ppm	Rate	SS ms/cm	Rate	Cl ppm	Rate	Al ppm
#1	3.0	17.1	66.9	1.2	12.2	9																		

Values on this report represent the plant available nutrients in the soil. Rating after each value: VL (Very Low), L (Low), M (Medium), H (High), VH (Very High). ENR - Estimated Nitrogen Release. C.E.C. - Cation Exchange Capacity.

Explanation of symbols: % (percent), ppm (parts per million), lbs/A (pounds per acre), ms/cm (milli-mhos per centimeter), meq/100g (milli-equivalent per 100 grams). Conversions: ppm x 2 = lbs/A, Soluble Salts ms/cm x 640 = ppm.

This report applies to sample(s) tested. Samples are retained a maximum of thirty days after testing.

Analysis prepared by: A&L Eastern Laboratories, Inc.

by: Pauric McGroary

Pauric McGroary

Report Number
11-109-0507 **Page:** 1 of 2

Account Number
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Client : PLI

A&L Eastern Laboratories, Inc.
7621 Whitepine Road Richmond, Virginia 23237 (804) 743-9401 Fax (804) 271-6448
www.aleastern.com

Submitted By : DAVID STONEMAN
Purchase Order :
Report Date : 4/22/2011
Date Received : 4/19/2011

REPORT OF ANALYSIS

Nitrogen, Ammoniacal Total Kjeldahl Nitrogen

SOIL AMMONIA-N SM-4500-NH3C-TKN

Lab No	Sample ID Sample Date and Time		ppm		
08891	#6	Ammonia - 3.1	1400 - Total N	1400-3.1 organic	1396.9
08892	#5	2.6	1640		1637.4
08893	#4	2.3	1280		1277.7
08894	#3	2.9	1390		1387.1

Pauric McGroary

Pauric McGroary

Sample results are reported 'as received' and are not moisture corrected unless noted

Report Number
11-109-0507 **Page:** 2 of 2

Account Number
74017

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Submitted By : DAVID STONEMAN
Purchase Order :
Report Date : 4/22/2011
Date Received : 4/19/2011

Client : PLI

REPORT OF ANALYSIS

Nitrogen, Ammoniacal Total Kjeldahl Nitrogen

SOIL AMMONIA-N SM-4500-NH3C-TKN

Lab No	Sample ID Sample Date and Time	ppm			
					[illegible]
08895	#2	2.1	1530 - 2.1	=	1528.9
08897	#1	1.9	960		958.1

Method Reference:
Methods of Soil Analysis, Part 3 - Chemical Methods, 2nd Ed. Rev. Soil Science Society of America, Black, C.A et al. 1982, pages 1129-1131.
Methods of Soil Analysis, Part 3 - Chemical Methods, 2nd Ed. Rev. Soil Science Society of America, Black, C.A et al. 1982, pages 1185-1186.
Standard Methods for the Analysis of Water and Wastewater, 20th Ed. 1998

Pauric McGroary

Pauric McGroary

Sample results are reported 'as received' and are not moisture corrected unless noted