

From: [Wade Murphy](#)
To: [Brad Harris](#); [Elizabeth Rorie](#)
Cc: envsoilconsulting@charter.net; [Woody Smith](#); [Vojin Janjic](#)
Subject: FW: Annual Report and Maintenance - IRM Utility, Inc - 2016
Date: Thursday, April 06, 2017 12:56:37 PM
Attachments: [image001.png](#)

Brad, will you please have someone respond to Jeffrey's question below. If you or your staff have questions, feel free to contact me. Thank you.

Beth, thank you for offering to upload Jeffrey's attached **[2016 Maintenance Inspection Summary and Monitoring Results For IRM Utility SOPs](#)** to the multiple permit numbers it covers:

02012
04012
01003
04067
06001
03012
04027
05054
06039
08013



Wade D. Murphy | E.I.
Division of Water Resources, Water-Based Systems Unit
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312 Rosa L. Parks Ave 37243
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From: envsoilconsulting@charter.net [mailto:envsoilconsulting@charter.net]
Sent: Wednesday, April 5, 2017 10:54 AM
To: [Woody Smith](#); [Wade Murphy](#)
Subject: Annual Report and Maintenance - IRM Utility, Inc - 2016

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Gentlemen -

As you know, these systems require quite a bit of attention. We are fencing Flat Hollow in Campbell County and Sterling Springs in Sevier County. Please let me know how to, or if I need to amend my Permits.

Thank you,

Jeffrey Cox



Annual Report for 2016

Operation and Maintenance Inspection Schedule

Pursuant to the Tennessee Department of Environment and Conservation
Division of Water Pollution Control, State Operating Permit Program

Prepared for: Division of Water Resources, Permit Section

Integrated Resource Management, Inc.

A Privately Owned Public Utility

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March 27, 2017

Woodson L. Smith
Division of Water Pollution Control
State of Tennessee Department of Environment and Conservation
Knoxville Environmental Field Office
3711 Middlebrook Pike
Knoxville, Tennessee 37921

RE: Operation Maintenance Monitoring Report 2016

Permit No. SOP 02-012
Cove Mountain Realty
Sevier County, Tennessee

Permit No. 04-012
Emory Pointe
Roane County, Tennessee

Permit No. 01-003
Lost Creek
Union County, Tennessee

Permit No. 04-067
Wild Briar
Sevier County, Tennessee

Permit No. 06-001
Mountain Shangrila
Sevier County

Permit No. SOP 03-012
Valley Mart Exxon
Sevier County, Tennessee

Permit No. 04-027
Compass Pointe
Blount County, Tennessee

Permit No. 05-054
Sterling Springs
Sevier County, Tennessee

Permit No. 06-039
Flat Hollow
Campbell County, Tennessee

Permit No. 08-013
Cove Creek Resort
Sevier County

Dear Mr. Smith,

Enclosed are updated spreadsheets reporting analysis for the facilities listed above. Actual analysis certificates and Chain-of-Custody forms are available at your request. IRM Utility, Inc. ("IRM") has noted on the Chain-of-Custody form and to the laboratory that results of "None Detected or ND" will not be acceptable results in the future. IRM will be glad to supply any additional information upon your request. Attached are the analysis summaries for the facilities listed above.

Preface: As Microbiologist by degree (emphasis on soils and wastewater), my training has exposed me to many concepts of wastewater treatment. In summary, there are many processes in the soil that indicate the drip irrigation of treated wastewater disposal area to be considered a tertiary treatment. There are many microbial and soil colloid microsites that provide a variety of nutrient wastewater treatment. The cation exchange capacities in relation to permeability of soils provide these sites for mineralization, denitrification, filtering, and overall nutrient management.

There have been high Escherichia coli samples with gravity flow Ultra-violet light and the pressurized systems. These systems are highly undependable. Escherichia coli are an enteric organism and have a limited time of viability or life in natural soils. The *E. coli* organism indicating pathogens have specific temperature, salinity requirements, etc. as an environment for viability of these organisms. This is why raw sewage and septic tank subsurface sewage disposal works on appropriate soils. Below is a summary discussion for each system for the year 2016:

Cove Mountain SOP# 02012

Observations; The system is working well.

Actions and Management; No corrective treatments were needed in 2016. IRM cleaned filters often in 2016. The line from the splitter to the dosing tank needed flushed two times. The pumps were pulled in the recirculation and dosing tanks and floats were checked and adjusted. Pump inlets were cleaned.

The facility was purchased after a bankruptcy by a new owner. The water use has been less than one-fourth of the capacity of the system. The new owner is aware of the capacity and is proposing a building with two office type businesses. There will be only one bathroom in each for non-transient use. The expected flows are expected to be within permit limits.

Valley Mart Exxon SOP# 03012

Observations; The system mechanically is working well.

History; It was observed that the recirculation media has developed colonies of encapsulated organism colonies that tend to blanket the fixed film media and create anoxic cover much like an umbrella.

We have determined the cause of the high BOD may be direct sunlight on Single Cell Aerobic Treatment unit causing thermophilic colonies to form. The best course of action may be to shade and insulate the unit which may allow more favorable conditions for natural biological processes to create an environment for suitable colonies to form. We have replaced some of the media.

Actions and Management;

Although the BOD₅ has been above the Permit limits, it is calculated that the theoretical total BOD₅ loading of 45 mg/l (PPM) yields a limit of 0.75 pounds per day.

Considering the BOD₅ of 80.3 mg/l and the average flow of 424 gal/day, the BOD₅ loading is calculated to be 0.285 lbs/day. This is less considerably less than the total theoretical loading of .75 lbs/day.

The drip field is fully restored now that mowers are moving perpendicular with drip rows rather than parallel with drip lines which caused mower tires to compact over drip tubing. The area has been left un-mowed for a few months in the summer of 2015 for nutrient removal and further healing. The drip area has been mowed and the field is in very good condition.

Emory Pointe SOP# 04-012

Observations; The system is working well. There have been issues with the transducers that indicate the tank levels.

Actions and Management; The system was switched to float indicators. The telemetry controls were found to be inoperable and this was due to an AT&T line issue. This was reported and the connection was corrected by AT&T.

Compass Pointe SOP# 04-027

Observations; The treatment system is working well. The major concern is the Ultra-violet light system and the sample port configuration. The soils at Compass Pointe are excellent Dewey and Decatur Soils and no outcropping occurs. The danger of a possible vector contact is if there is a failure and the occurrence of puddles of sewage on the surface. The effluent flows are low compared to the design flow and the soil's capacity to absorb the effluent.

Actions and Management; IRM has had problems with the gravity flow uV disinfection units that the engineer designed in the system. The internal parts of these systems do not include a cleaning bar to scrape the crystal and total dismantling of the unit is required to clean the quartz crystal the bulb is enclosed in. We are considering contacting the Home Owners Association and proposing the fencing of the area. As many occurrences as IRM has been on the site, we have never seen any people, dogs, or animals on the site. The only personnel contact is the contracted mower who is well aware of the use of the site. With consideration of the distance of sensitive receptors and the conditions of the soils, IRM contends that the site is not a threat to Waters of the State or human health.

Lost Creek SOP# 01-003

Observations; The system is working well. The sand filter needed manual weeding a few times in 2016 as usual routine maintenance.

Actions and Management; The weeding was performed manually without the use of pesticides. Replacement of the uV bulb occurred and there were good readings the first 3 quarters. A high reading was noticed in the 4th quarter. This will be serviced in 2017.

Sterling Springs SOP# 05-054

Observations; The system is working well. The e-coli counts were good on the first quarter but then are high the last three quarters. The flows monitored are less than the system capacity at this time and the system is working within the design capacity of the system.

Actions and Management; The average daily use of the system is 3000-4000 gpd. The first phase has the capacity for 12,600 gpd. IRM Utility, Inc. with cooperation of the HOA has imposed a restriction of approving bedroom counts and sizes of homes for the future and will continue monitoring the capacity.

The drip field areas have restricted access by a gate in one area and the other drip area also has restricted access due to its location. IRM proposes to fence this area in 2017 and adjust the Permit accordingly.

Wild Briar SOP# 04-067

Observations; The system is working well. The sample as reported in the 1st quarter had a slightly high BOD₅ of 48.6 and the 4th quarter had a 68.6 mg/l. There have been 6-8 new cabin units built and added to this facility. The e-coli analysis is running high although the bulb was replaced.

Actions and Management; Due to the increase in cabin units, additional adjustments have been made for increased recirculation in treatment. This is always anticipated during an increase in effluent treatment. This is part of the design of the system. The additional aerobic fixed film treatment was activated for Phase II of the system to provide additional treatment at the end of 2016. The treatment should become more effective when the units begin inoculation and growth of media organisms. A flow meter is to be installed in 2017 so dosing times and frequencies of the media be adjusted accordingly.

The crystal scrubber was damaged on the uV disinfection unit and repaired. A total overhaul of the uV unit will be performed if the first quarter analysis illustrates high values.

Based on the same reasons that were described in the Compass Pointe analysis and due to the fact that this flow is low in relationship to the large system which is designed for 24,000 gpd and irrigated in the broad acreage, with and the drip irrigation sites are very remote, there is not a situation which is harmful to the "Waters of the State" or human health.

Flat Hollow SOP# 06-039

Observations; The system is working well. The telemetry notified IRM of power outages many times in 2016. This site is prone to power outages and they are typically during thunder storms and only durations of two to three hours. This system has the same type of uV that is used at Compass Pointe.

Actions and Management; The increased cleaning and management of the uV disinfection crystal appears to be effective and subsequent counts improved. Fencing of the area has been initiated and will be completed in 2017. The appropriate Permit

modifications will be requested. The STEP system floats are set to allow freeboard to collect flows for 24–48 hours. When homes are without power, typically less water is used. The operation of the system was maintained and monitored by computer based telemetry continuously.

Mountain Shangrila SOP# 06-001

Observations; The system is working well. Transducers on this site indicate alarms and regulate timer override pump starts. IRM received messages by telemetry.

Actions and Management; The disinfection light had a ground fault breaker thrown which was turned on and remedied the disinfection issue in the first quarter. The system was running well. The transducers needed cleaned. Normal routine visits are being made.

Cove Creek Resort SOP# 08-0013

Observations; The system is working well. Under high peak summer conditions the BOD increased. This will be watched in 2017 by making adjustments for the higher seasonal flows. The typical disinfection issues occurred at the end of the year and the bulbs have been replaced. If that does not correct the situation the disinfection system may need an overhaul.

Actions and Management; Managers of Cove Creek Resort have been notified about capping service connects prior to high water conditions to eliminate Inflow and Infiltration issues. No additional management other than routine maintenance is needed at this time.

Ashley Meadows, Blount County, SOP# 07-0006

No customers at this time.

Landing at River's Edge SOP# 07-0056

Construction not completed.

Moutainscape SOP# 07-0080

Construction not completed.

Respectfully submitted,



Jeffrey W. Cox, Sr.

Monitoring Spreadsheet
Site Cove Mountain Realty
SOP # 02012
Address 3202 Wears Valley Road
Sevierville, TN 37862
2016

Design Flow (gals/day)

2000

Build Out < 15%

Parameters Required By Permit		Date	Reading Off Monthly Bill (consumption)	Days In Billing Period	Water Use (Daily Avg) 2000	BOD5 mg/l 45 Once Per Year	NH3-N Report
Limit	Fenced						
1st Quarter		12/14/2015	6680				
		1/19/2016	10930	36	304		
		2/14/2016	5560	26	214		
		3/16/2016	10570	31	341		
Microbac 2nd Quarter	3/9/2016	4/19/2016	12890	34	379	2.2	3.6
		5/18/2016	7980	29	275		
		6/14/2016	8280	27	307		
Microbac 3rd Quarter	6/28/2016	7/15/2016	12560	31	405	-	<.074
		8/17/2016	15160	33	459		
		9/16/2016	12790	30	426		
Microbac 4th Quarter	9/12/2016	10/18/2016	13770	32	430	-	13.1
		11/15/2016	13060	28	466		
		12/12/2016	10740	27	398		
Microbac	12/27/2016	1/17/2017	12290	36	341	-	10.3

Monitoring Spreadsheet

2016

Site Valley Mart Exxon
 SOP # 03012
 Address 3201 Wears Valley Road
 Sevierville, TN 37862

Parameters Required By Permit	Date	Design Flow (gals/day)		Water Use (Daily Avg) 2000	Build Out < 20%	
		Reading Off Monthly Bill (consumption)	Days In Billing Period		BOD5 45 mg/l or lbs/day	NH3-N Report
Limit					0.7506 Once Per Year	
1st Quarter	New Owner					
	12/14/2015					
	1/19/2016	14610	36	406		
	2/14/2016	8210	26	316		
	3/16/2016	11330	31	365		
Microbac	2/14/2016				80.3	87
2nd Quarter	4/19/2016	15830	34	466	lbs/day	
	5/18/2016	13460	29	464	0.23908	
	6/14/2016	14210	27	526		
Microbac	6/28/2016					11.11
3rd Quarter	7/15/2016	15140	31	488		72.5
	8/17/2016	13320	33	404		
	9/16/2016	12900	30	430		
Microbac	9/12/2016				-	72.5
4th Quarter						
	10/18/2016	16460	32	514		
	11/15/2016	15080	28	539		
	12/12/2016	9960	27	369		
Microbac	12/27/2016				-	85.5
	1/17/2017	12920	36	359		
					#VALUE!	
		Yearly Total	Days	Daily Average		
				*Without Toilet Leak		

**Monitoring Spreadsheet
2016**

Site **Emory Pointe**
 SOP # **04-012**
 Address **Roane County**

Design Flow (gals/day) 25250 Build Out < 8%

Parameters Required By Permit	Date	Water Use	BOD5	NH3-N
Fenced		Daily Estimate gpd	mg/l 45 Once Per Year	Report

1st Quarter

Microbac	3/31/2016	<4000		1.06
2nd Quarter				
Microbac	6/21/2016	<4000	8.8	32.9
3rd Quarter				
Microbac	9/20/2016	<4000	-	6.33
4th Quarter				
Microbac	12/31/2015	<4000		23.8

Site
SOP #
Address

Compass Pointe
04-027
Blount County

Design Flow (gals/day) 3500 Build Out <33%

Parameters Required By Permit	Date	Water Use NOT METERED	(Daily Avg) gpd	BOD5 mg/l 45	NH3-N Report	E.Coli 941/100ml
1st Quarter						
Microbac	3/31/2016		1155	11	48.4	>2400
2nd Quarter						
Microbac	6/24/2016	gallons days	0	1155	7.1	53.2 1300
3rd Quarter						
Microbac	9/20/2016	gallons days	0	1155	34.3	57.3 >2400
4th Quarter						
Microbac	12/31/2015	gallons days	0	1155	20.80	34.1 1,300

**Monitoring Spreadsheet
2016**

Site **Lost Creek**
SOP # **01-003**
Address **Union County**

Design Flow (gals/day) 5000 Build Out < 25%

Parameters Required By Permit	Date	Water Use (Daily Avg) gpd	NO3-N Report	BOD5 mg/l 45	NH3-N Report	E.Coli 941/100ml	
1st Quarter		Meter Estimated 1,545,800 48,200 gallons 187 days	258				
Microbac	3/31/2016			9.1	<2.00	0.111	<1
2nd Quarter		1,545,800					
Microbac	6/24/2016	gallons days	<300	19	10.8	22.2	200
3rd Quarter							
Microbac	9/17/2016	gallons days	<300	13	5.7	38.4	126
4th Quarter							
Microbac	12/19/2016	gallons days	<300	16.1	7.3	7.59	2000

**Monitoring Spreadsheet
2016**

Site Sterling Springs
SOP # 05-054
Address Sevier County

Parameters Required By Permit	Date	Water Use (Daily Avg)	BOD5 mg/l 45	NH3-N Report	E.Coli 941/100ml Very Restricted Access
1st Quarter Microbac	3/9/2016	2032	3.9	9.56	<1
2nd Quarter Microbac	6/28/2016	3493	26.6	32.9	>2400
3rd Quarter Microbac	9/12/2016	6203	11.2	11.7	>2400
4th Quarter Microbac	12/27/2016	3941	40.3	19.7	>2400

**Monitoring Spreadsheet
2016**

Site Wild Briar
SOP # 04-067
Address Sevier County

Design Flow (gals/day) 25200 Build Out Approximately 50%

Parameters Required By Permit	Date	Water Use	Estimated (Daily Avg) gpd	BOD₅ mg/l 45	NH₃-N Report	E.Coli 941/100ml Limited Access Partially Fenced Area
			To Be Metered			
1st Quarter Microbac	3/9/2016	gallons days	<10,000	105	61	>2400
2nd Quarter Microbac	6/28/2016	gallons days	<10,000	34.3	61	>2400
3rd Quarter Microbac	9/12/2016	gallons days	<10,000	203	52.3	>2400
4th Quarter Microbac	12/27/2016	gallons days	<10,000	144	75.1	>2400

**Monitoring Spreadsheet
2016**

Site Flat Hollow
SOP # 06-039
Address Campbell County

Design Flow (gals/day) 6000

Build Out 90%

Parameters Required By Permit

			Telemetry Report Calculated gpd	NO ₃ -N Report	BOD ₅ mg/l 45	NH ₃ -N Report	E.Coli 941/100ml
1st Quarter							
Microbac	3/31/2016	Jan	266	31.9	9.5	49.9	>2400
		Feb	207				
		Mar	326				
		Average	266				
2nd Quarter							
Microbac	6/29/2016	April	326	0.625	11.4	50.5	>2420
		May	800				
		June	2192				
		Average	1106				
3rd Quarter							
Microbac	9/17/2016	July	4635	17	24.1	44.4	130
		Aug	1066				
		Sept	385				
		Average	2029				
4th Quarter							
Microbac	12/19/2016	Oct	414	-	7.3	2.36	2400
		Nov	622				
		Dec	355				
		Average	464				

**Monitoring Spreadsheet
2016**

Site Mountain Shangrila
SOP # 06-001
Address Sevier County

Design Flow (gals/day) 16000 Build Out <10%

Parameters Required By Permit	Date	Water Use		NO3-N Report	BOD5 mg/l 45	NH3-N Report	E.Coli 941/100ml
		Wells	(Daily Avg) gpd Estimate				
1st Quarter Microbac	3/9/2016	gallons days	<1600	<0.0074	16.3	46.8	>2400
2nd Quarter Microbac	6/28/2016	gallons days	<1600	2.11	13.8	48.8	7
3rd Quarter Microbac	9/12/2016	gallons days	<1600	2.32	23.8	12.6	2
4th Quarter Microbac	12/27/2016	gallons days	<1600	0.02	10.1	3.97	<1

**Monitoring Spreadsheet
2016**

Site Cove Creek RV
SOP # 08-0013
Address Sevier County

Design Flow (gals/day) 17385 Build Out < 15%

Parameters Required By Permit	Date	Reading Off Monthly Bill (consumption)	Days In Billing Period	Water Use (Daily Avg)	NO3-N Report mg/l	BOD5 45	NH3-N Report	E.Coli 941/100ml	
1st Quarter	1/19/2016	119,900	36	3331					
	2/14/2016	117,100	26	4504					
	3/16/2016	88,300	31	2848					
Microbac	3/9/2016				11.1	>2.00	0.748	1	
2nd Quarter	4/19/2016	121600	34	3576					
	5/18/2016	89400	29	3083					
	6/14/2016	92700	27	3433					
Microbac	6/28/2016				30.8	56.8	22.6	310	
3rd Quarter	7/15/2016	138500	31	4468					
	8/17/2016	145100	33	4397					
	9/16/2016	133400	30	4447					
Microbac	9/12/2016				<0.014	84.5	108	>2400	
4th Quarter	10/18/2016	142,300	32	4447					
	11/15/2016	116,000	28	4143					
	12/12/2016	114,200	27	4230					
Microbac	12/27/2016	1/17/2017	185200	36	5144	0.057	40.5	35.7	>2400