



# TABLE OF CONTENTS

ACKNOWLEDGEMENTS.....	3
EXECUTIVE SUMMARY.....	5
CHAPTER 1: INTRODUCTION.....	6
CHAPTER 2: LITERATURE REVIEW.....	9
Identifying Water Quality Standards.....	9
Background of Current Condition.....	10
Identifying Customers.....	11
CHAPTER 3: AREA TO BE INVESTIGATED.....	12
CHAPTER 4: FINDINGS.....	14
Market Classification.....	14
Territory	
Facility Size	
Market Classification Based on Permit Expiration.....	17
Forecast Profit for Facilities 0.5 to 1 MGD.....	21
Forecast Profit for Facilities 1 to 20 MGD.....	23
Forecast Profit for Facilities with more than 20 MGD.....	26
Forecast Summary over Estimated Profit to Year 2013.....	28
Forecast Breakdown of Customer by Year Profit Received.....	28
CHAPTER 5: SUMMARY & CONCLUSIONS.....	31
Summary of Profit Received by Year.....	31
SUGGESTIONS FOR ADDITIONAL WORK.....	33
BIBLIOGRAPHY.....	34
GLOSSARY & ACRONYMS.....	36
APPENDIX.....	39

## ACKNOWLEDGEMENTS

---

This project would not be possible if it were not for the support of my family, faculty and employer. With my family life, career and continuing education, I am grateful for the support of many people and institutions.

I want to thank my wife for supporting me through this project and degree program. My heart goes out to our children where we shared a common bond of going to school and doing homework together. I want to thank them for their support and excitement of learning and improving their knowledge.

The faculty and the engineering management program at Kansas University are exceptional. I would like to thank Herb Tuttle whose lectures were inspirational and provided real world experiences to the management field. One of my favorite and most useful classes that helped me in my career as a salesperson is Linda Miller's marketing class. This field project marketing plan would not be possible without the skills learned in her marketing class. I would like to personally thank Linda for her help and assistance on this field project.

I would like to thank my employer for supporting me through this project. Both my employer and I mutually benefit from the research and findings of this marketing plan. I appreciate the help I received from my managers and coworkers, especially Kathi

Graham, who performed assistance throughout the project and performed an exhaustive peer review. I owe much gratitude to Kathi Graham for her help.

## EXECUTIVE SUMMARY

---

In 1996, the federal Clean Water Act established a national goal to protect fish and wildlife and recreational uses in its waterways, lakes and rivers of the United States. Each state is in charge of its compliance to the federal rules. The State of Missouri finalized and passed new effluent regulations for wastewater treatment plants that discharge into these waterways. These changes were effective as state law on December 31, 2005, providing a compliance schedule for all facilities. The standards included disinfection of bacterial source discharges into waterways designated for recreational uses. The type of equipment identified by the United States Environmental Protection Agency (USEPA) and predominately used to disinfect bacteria is ultraviolet (UV) disinfection.

This marketing plan identifies specific opportunities to provide disinfection equipment. The plan identifies the feasible customers in the company's territory of a minimum flow size that currently do not disinfect and requires UV disinfection to comply with the classification of the water body as whole body contact (WBC). The expected profit to be received from the years of 2008 through 2013 is \$758,000.

The marketing plan provides a strategic sales plan to promote and sell UV disinfection equipment.

## CHAPTER 1: INTRODUCTION

---

The State of Missouri passed a new state law effective December 31, 2005, that has a tremendous impact on the municipalities that have wastewater treatment plants. This new rule changes the state's water quality effluent standards in effort to improve Missouri waters for fishing and swimming. The new law is in response to heavy criticism from the USEPA for not safeguarding bacterial levels in lakes and streams including a 1998 USEPA audit that 75 percent of streams and 11 percent of its lakes were not certified as swimmable.<sup>1</sup>

After the rulemaking, all of Missouri's lakes and streams were classified as WBC recreational use, with the exception of 142 streams. Before the rulemaking, only 32 percent of the lakes and 7.6 percent of the streams were classified for WBC. After the rule went into affect, 100 percent of lakes and 96 percent of streams require WBC. This requires an additional 30,000 acres of lakes and additional 15,000 miles of streams to be classified for WBC.<sup>2</sup>

---

<sup>1</sup> Miglena Sternadori, "Projected tab for wastewater cleanup set at \$305 million in Missouri", Knight Ridder Tribune Business News. Washington, page 1, Nov 10, 2004.

<sup>2</sup> State of Missouri Disinfection Workshop, "Water Quality Standards: How will your recent revisions affect your operation?", Missouri Department of Natural Resources, Division of Environmental Quality Water Protection Program, November 8-16, 2005.

The new effluent standards proposed requires wastewater treatment facilities discharging into these lakes and streams classified as WBC to comply with bacterial limits. Disinfection equipment would be required to treat discharges into the classified streams unless an evaluation shows that disinfection is not required in order to meet bacteria standards. An additional way to not provide disinfection is to remove it from classification as a WBC through a “Use Attainability Analysis” (UAA) that shows the stream cannot support swimming due to factors of natural pollutants. Of 410 UAA’s submitted, only 142 WBC classified waters have been removed.

According to a Missouri Department of Natural Resources (MDNR) report, UV disinfection method is appropriate for 314 wastewater facilities and would cost \$212.8 million.<sup>3</sup>

Even though Missouri has been addressing this issue for more than five years with stakeholder meetings and draft standards, the final rules have been set. Since every waterway is affected, every municipality that discharges to it is also affected. Confusion from consulting engineers and municipalities exist on how to comply and how much money is required for compliance.

This project seeks to research and understand these regulations and how to apply them for sales opportunities. The project prepares a marketing plan that identifies specific

---

<sup>3</sup> State of Missouri Regulatory Impact Report for Proposed Rule Amendment 10 CSR 20-7.03 Water Quality Standards, Missouri Department of Natural Resources, Water Protection and Soil Conservation Division, Water Protection Program, [http://www.dnr.mo.gov/env/wpp/rules/10CSR20-7.031\\_rir.pdf](http://www.dnr.mo.gov/env/wpp/rules/10CSR20-7.031_rir.pdf), Feb.10, 2005.

customers and opportunities and a strategic sales plan to promote and market UV disinfection equipment.



## CHAPTER 2: LITERATURE REVIEW

---

The review of literature for this marketing plan was comprised into three areas including:

1) understanding the new effluent water quality standards, 2) investigating the background of these new regulations and 3) determining the customers that are affected by these regulations. The concentration of the research is limited to understanding the state and federal regulations and applying this knowledge to identify and determine wastewater treatment plants that are affected by these new regulations.

### **Identifying Water Quality Standards**

Missouri's Water Quality Standards (WQS) contain criteria adopted from the USEPA and include classifications or designations for the use of water bodies within the state. The state adopts the Water Quality Standards (WQS) under section 303(c) of the Clean Water Act (CWA) designating the water quality that supports a particular use.<sup>4</sup> These classifications are found in the Code of State Regulations (CSR), Title 10, MDNR, Division 20, Chapter 7 titled Water Quality.<sup>5</sup> The classification included waters protected for WBC recreation requiring a bacteria standard for activities such as swimming.

---

<sup>4</sup> Clean Water Act, Section 303, Adoption of WQS, Section 304, Water Quality Criteria and Measurement and 40 CFR Part 131 amended.

<sup>5</sup> The department's Water Quality Standards, Division 20- Clean Water Commission, Chapter 7 – Water Quality, Effluent Regulations, 10 CSR 20-7.015 and Water Quality Standards, 10 CSR 20-7.031, <http://www.sos.mo.gov/adrules/csr/current/10csr/10c20-7a.pdf>.

Missouri's WQS require review every three years per Code of Federal Regulations (CFR), 40 CFR 131.20. In 2000, USEPA disapproved portions of Missouri's WQS revisions citing they were inconsistent with the Federal CWA.<sup>6</sup>

### **Background of Current Condition**

In October 2003, The Missouri Coalition for the Environment filed a complaint against Missouri and the USEPA including concerns if Missouri's approach for classifying waters for WBC to meet the swimmable goal of the CWA including 40 CFR 131.6(a), (f) and 131.10.<sup>7</sup> A settlement between parties was reached on December 27, 2004, and a consent decree was published including designations for a WBC for waterways in Missouri.

To comply with the demands of USEPA, the Missouri Clean Water Commission amended the WQS and effluent regulations with an effective date of December 31, 2005. These were prepared with public involvement including Stakeholder meetings and involved public input to this report. A summary of these meetings including public comment and the commissions response was published in a report titled, Final Order of

---

<sup>6</sup> Gale Hutton, Director Water, Wetlands and Pesticides Division, USEPA, Region 7, letter from U.S. Environmental Protection Agency (USEPA) that approved and disapproved parts of Missouri's WQS, U, Kansas City, Kansas, Sept. 8, 2000. [http://www.dnr.mo.gov/env/wpp/rules/usepa\\_2000\\_letter-pgs1-14.pdf](http://www.dnr.mo.gov/env/wpp/rules/usepa_2000_letter-pgs1-14.pdf), [http://www.dnr.mo.gov/env/wpp/rules/usepa\\_2000\\_letter-pgs\\_15-30.pdf](http://www.dnr.mo.gov/env/wpp/rules/usepa_2000_letter-pgs_15-30.pdf).

<sup>7</sup> Missouri Coalition for the Environment vs. Leavitt, Settlement Agreement, Case No. 03-4217-CV-C-NKL(W.D. Mo), by Plaintiff on October 7, 2004, [http://www.dnr.mo.gov/env/wpp/wqstandards/2004-12-16\\_SettlementAgreement\\_USEPAvsMCE.pdf](http://www.dnr.mo.gov/env/wpp/wqstandards/2004-12-16_SettlementAgreement_USEPAvsMCE.pdf), December 16, 2004.

Rulemaking 10 CSR 20-7.015, Effluent Regulations <sup>8</sup> and Final Order of Rulemaking, 10 CSR 20-7.031, Water Quality Standards.<sup>9</sup>

These revisions to the WQS require all waters are presumed to be considered swimmable with a WBC recreation classification. The only exception that a WBC designation may be removed is through an UAA <sup>10</sup>. The UAA would demonstrate that no swimming uses occur or characteristics make it extremely unlikely that any swimming could occur on the stream.

### **Identifying Customers**

The new water quality regulations require wastewater treatment facilities to begin monitoring for bacteria and disinfecting the wastewater. A Missouri Department of Natural Resource (MDNR) document titled, Regulatory Impact Report for Proposed Rule Amendment 10 CSR 20-7.031 identified the type of disinfection required, the facilities impacted and the estimated cost of complying with the new regulations.<sup>11</sup> This report provided a list of wastewater treatment not currently disinfecting and within two miles of classified water. Individual facilities affected by this rule were taken from MDNR's Water Quality Information System database (WQIS).

---

<sup>8</sup> State of Missouri Final Order of Rulemaking, 10 CSR 20-7.015, Effluent Regulations, [http://www.dnr.mo.gov/env/wpp/rules/10\\_CSR\\_20-7\\_015\\_ORM\\_CWCApproved.pdf](http://www.dnr.mo.gov/env/wpp/rules/10_CSR_20-7_015_ORM_CWCApproved.pdf).

<sup>9</sup> State of Missouri Final Order of Rulemaking 10 CSR 20-7.031, Water Quality Standards, Sept. 9, 2005. [http://www.dnr.mo.gov/env/wpp/rules/10\\_CSR\\_20-7\\_031\\_ORM\\_CWCApproved.pdf](http://www.dnr.mo.gov/env/wpp/rules/10_CSR_20-7_031_ORM_CWCApproved.pdf), Sept. 9, 2005.

<sup>10</sup> State of Missouri Recreational Use Attainability Analysis Protocol, Missouri Department of Natural Resources Water Protection Program, [http://www.dnr.mo.gov/env/wpp/wqstandards/uaa/wpp\\_wqs\\_uaa.pdf](http://www.dnr.mo.gov/env/wpp/wqstandards/uaa/wpp_wqs_uaa.pdf), Nov. 3, 2004.

<sup>11</sup> State of Missouri Regulatory Impact Report for Proposed Rule Amendment 10 CSR 20-7.03 Water Quality Standards, Missouri Department of Natural Resources, Water Protection and Soil Conservation Division, Water Protection Program, [http://www.dnr.mo.gov/env/wpp/rules/10CSR20-7.031\\_rir.pdf](http://www.dnr.mo.gov/env/wpp/rules/10CSR20-7.031_rir.pdf), Feb.10, 2005.

## CHAPTER 3: AREA TO BE INVESTIGATED

---

The marketing plan is focused on the counties in Missouri in which the company represents UV disinfection products. The company has exclusive representative agreement for a manufacturer's UV disinfection for western Missouri as identified in the following figure.

**Figure 3-1**  
**Plan Territory – Eastern Missouri**  
**Counties Identified by Boundary**



The smallest size UV system that the company sells is rated at 0.5 million gallons per day (mgd). Thus, the wastewater treatment facility of interest has a minimum design flow of 0.5 mgd. The three ranges of flows the report will focus on are from 0.5 to 1 mgd, from 1 to 20 mgd and more than 20 mgd flow. There is no upper limit on the flow size of interest.

UV disinfection does not work well with lagoon's effluent, so facilities with lagoons will not be included as potential UV customers. The plan will focus on those facilities with a mechanical treatment plant which UV disinfection is common.

The plan will identify those facilities requiring equipment prior to the compliance date of 2013. If a wastewater treatment plant is upgrading capacity, it will require a new permit, within three years of the permit acceptance. The next group requiring compliance is those facilities under permit renewal. Compliance with the bacterial standard must be accomplished within three years of the renewal date. Since permits are renewed every five years, the facilities' requirement to renew is expected to be 20% per year. All facilities must comply with the bacterial standard by 2013.

## CHAPTER 4: FINDINGS

---

### Market Classification

The MDNR regulatory impact report identified 911 wastewater treatment facilities that would be impacted by the new stream classification and are not currently disinfecting.<sup>12</sup>

The plan will focus on those facilities within the company's territory and of a sufficient size to match the minimum size of UV equipment that we represent.

### Territory

The marketing plan is focused on the counties in Missouri where the company represents UV disinfection products. The company has exclusive representative agreement for a manufacturer's UV disinfection for western Missouri as identified in the following figure. Of the 911 identified facilities in Missouri, 367 are within the company's territory.

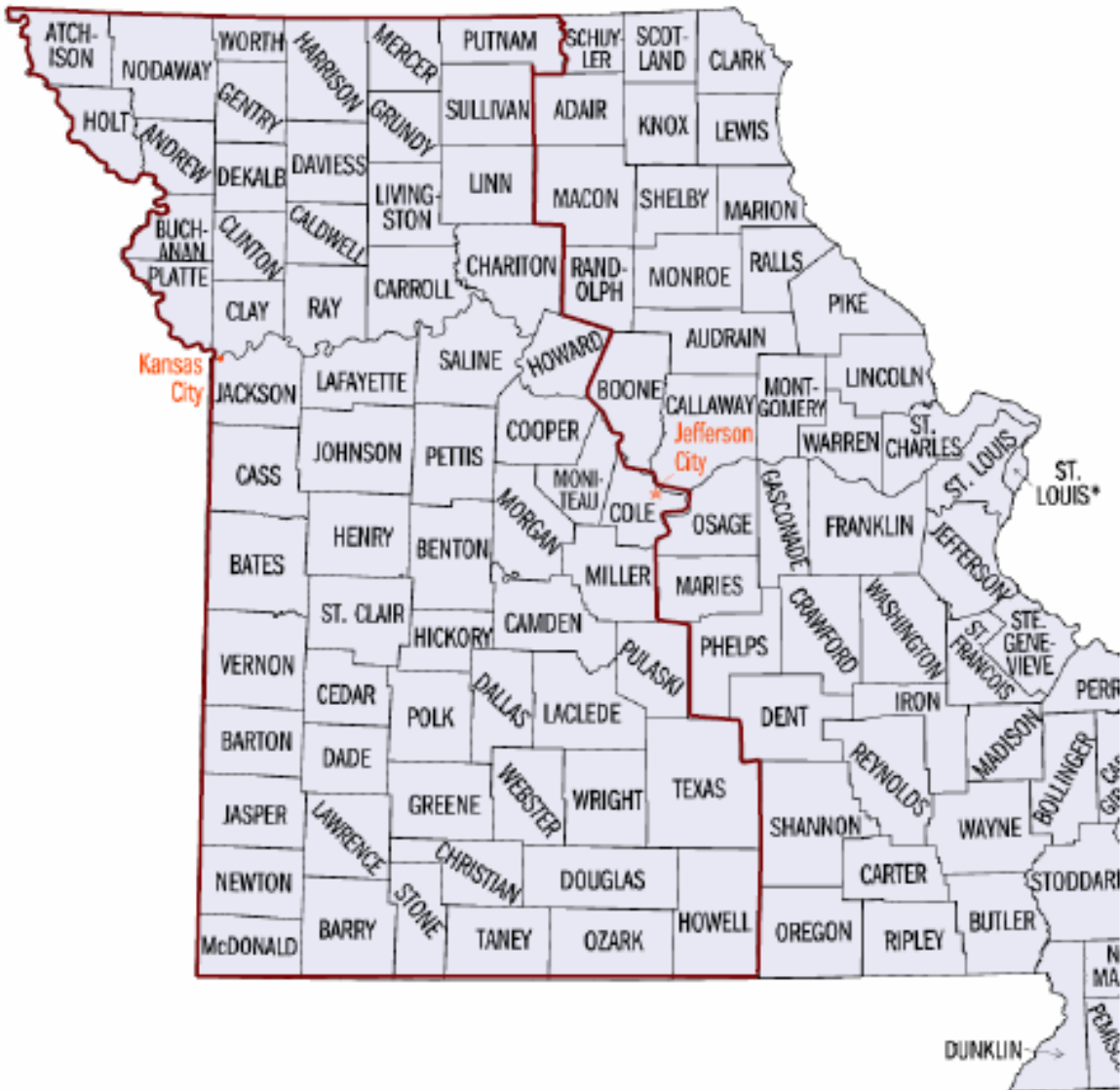
---

<sup>12</sup> State of Missouri Regulatory Impact Report for Proposed Rule Amendment 10 CSR 20-7.03 Water Quality Standards, Missouri Department of Natural Resources, Water Protection and Soil Conservation Division, Water Protection Program, [http://www.dnr.mo.gov/env/wpp/rules/10CSR20-7.031\\_rir.pdf](http://www.dnr.mo.gov/env/wpp/rules/10CSR20-7.031_rir.pdf), Feb.10, 2005.

Figure 4-1

Territory – Eastern Missouri

Counties Identified by Boundary



Facility Size

The smallest size facility that the company is interested in is at least 0.5 mgd.

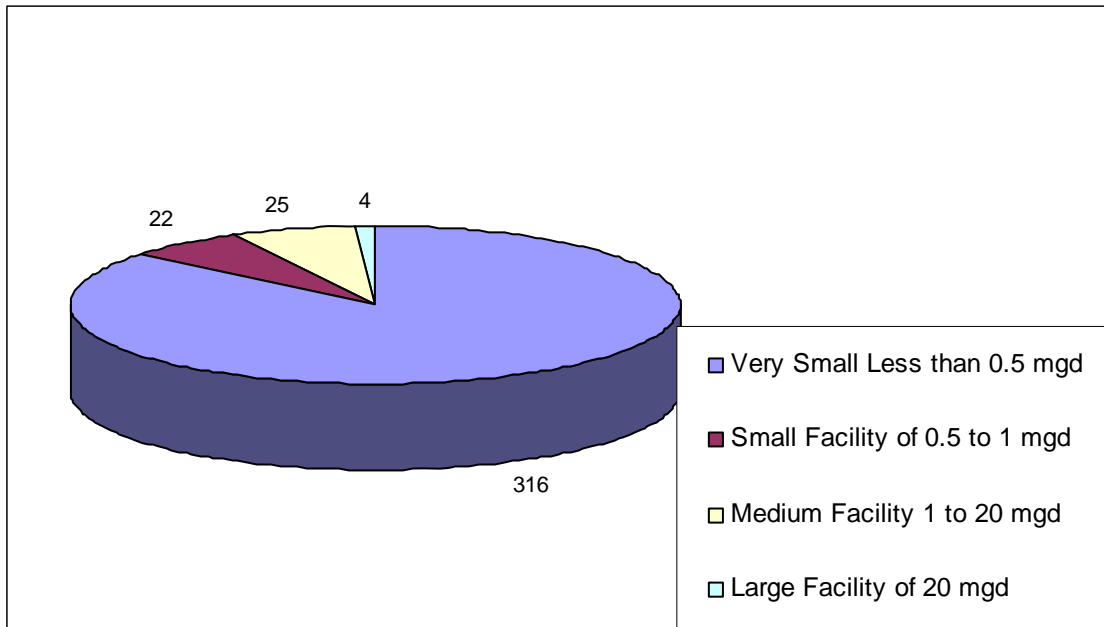
Flow sizes less than 0.5 mgd would not be worth the time and efforts to promote

the equipment. Even though the profits from 0.5 to 1 mgd represent a lower profit potential than projects above 1 mgd, the plan will pursue this flow range because the company sells other equipment in this range.

The three ranges of design flows that the plan will focus are from 0.5 to 1 mgd, from 1 to 20 mgd and more than 20 mgd flow. Each of these ranges has distinctive economies of scale in terms of pricing and emphasis. Of the 367 facilities within the territory, only 51 are above the minimum design flowrate of 0.5 mgd.



**Figure 4-2 Facility Size by Design Flow Rate in Territory**



### **Market Classification Based on Permit Expiration**

Compliance with the bacterial standard must be accomplished within three years of the renewal date. All facilities must comply with the bacterial standard by 2013.

If a wastewater treatment plant is upgrading capacity, it will require a construction permit triggering compliance within three years of the construction permit. These upgrades will be accomplished from projects bidding after December 31, 2005, and typically is within one to two years away.

The plan will identify all the feasible customers in our territory of a minimum flow size that currently do not disinfect and are required to comply due to the WBC classification

of the water body. The following tables indicate the specific feasible customers by flow category and prioritized by when the permit expires. The sooner the permit expires the sooner compliance is required. Several of the facilities in the table indicate that the permit has already expired. In these instances, these facilities are in negotiations with the state to establish a new permit and allowed to operate under the existing permit and will be the first required to comply.

The following table identifies the wastewater treatment facilities that are not currently disinfecting and within 2 miles of a classified water body for flow rates from 0.5 to 1.0 mgd:

**Table 4-1**

**Facilities Not Currently Disinfecting and within 2 Miles of a Classified Water  
Flow Rate From 0.5 to 1.0 mgd  
Plan Territory**

<b>No.</b>	<b>Expiration Date</b>	<b>City</b>	<b>Design Flow: mgd</b>
1	06/01	A	0.73
2	12/04	B	0.91
3	07/05	C	0.61
4	11/05	D	0.60
5	08/06	E	0.74
6	08/06	F	0.55
7	11/06	G	0.75
8	11/06	H	0.59
9	02/07	I	0.50
10	04/07	J	0.75
11	09/07	K	0.90
12	10/07	L	0.75
13	12/07	M	0.65
14	12/07	N	0.78
15	01/08	O	0.75
16	10/08	P	0.78
17	04/09	Q	0.71
18	09/09	R	0.70
19	12/09	S	0.50
20	01/10	T	0.80
21	02/10	U	0.82
22	05/10	V	0.75

The following table identifies the wastewater treatment facilities that are not currently disinfecting and within 2 miles of a classified water body for flow rates from 1 to 20 mgd:

**Table 4-2**

**Facilities Not Currently Disinfecting and within 2 Miles of a Classified Water  
Flow Rate From 1 to 20 mgd  
Plan Territory**

No.	Expiration Date	City	Design Flow: mgd
1	10/96	AA	10
2	01/06	BB	3
3	03/06	CC	15
4	03/06	DD	2
5	07/06	EE	2
6	11/06	FF	7
7	01/07	GG	3
8	03/07	HH	3
9	04/07	II	2
10	05/07	JJ	2
11	08/07	KK	3
12	10/07	LL	1
13	10/07	MM	2
14	04/08	NN	1
15	04/08	OO	2
16	07/08	PP	2
17	09/08	QQ	2
18	10/08	RR	1
19	10/08	SS	1
20	03/09	TT	6
21	07/09	UU	2
22	08/09	VV	2
23	12/10	WW	1
24	12/10	XX	3
25	12/10	YY	2

The following table identifies the wastewater treatment facilities that are not currently disinfecting and within 2 miles of a classified water body for flow rates above 20 mgd:

**Table 4-3**

**Facilities Not Currently Disinfecting and within 2 Miles of a Classified Water  
Flow Rate Above 20 mgd  
JCI Territory**

No.	Expiration Date	City	Design Flow: mgd
1	03/07	AAA	27
2	05/09	BBB	23
3	03/08	CCC	40
4	12/10	DDD	105

### **Forecast Profit for Facilities 0.5 to 1 MGD**

The estimated cost based for UV equipment for each facility is estimated assuming a peaking factor of 3.5 on the design flow and an actual cost for UV equipment of \$40,000 per million gallons of treated flow. The peaking factor of 3.5 is consistent with the peaking factor for this flowrate as identified in the Missouri Impact Report.<sup>13</sup> This value would be expected to be within fifteen percent of the actual expected bid cost for the equipment based on experience of bidding UV equipment in the past. The equipment cost is based on a manufacturer's typical scope of supply of equipment. The engineer could specify additional options that could increase the cost of the equipment but this is not considered in this plan.

---

<sup>13</sup> State of Missouri Regulatory Impact Report for Proposed Rule Amendment 10 CSR 20-7.03 Water Quality Standards, Missouri Department of Natural Resources, Water Protection and Soil Conservation

The expected profit for the UV equipment is estimated to be 15% of the equipment price. The plan estimates based on past performance that specific marketing to each customer should yield in a successful order at least 33% for each project. Thus if 33% of the projects are sold, then the company could achieve a profit of \$108,000 for the flow range of 0.5 to 1.0 mgd.

**Table 4-4**

**Estimated Profit  
Flow Rate From 0.5 to 1.0 mgd**

No.	Expiration Date	City	Design Flow: mgd	Equipment Price	Profit	33% Capture Profit
1	06/01	A	0.73	\$ 102,200	\$ 15,330	\$ 5,059
2	12/04	B	0.91	\$ 127,400	\$ 19,110	\$ 6,306
3	07/05	C	0.61	\$ 84,840	\$ 12,726	\$ 4,200
4	11/05	D	0.60	\$ 84,000	\$ 12,600	\$ 4,158
5	08/06	E	0.74	\$ 102,900	\$ 15,435	\$ 5,094
6	08/06	F	0.55	\$ 77,000	\$ 11,550	\$ 3,812
7	11/06	G	0.75	\$ 105,000	\$ 15,750	\$ 5,198
8	11/06	H	0.59	\$ 82,600	\$ 12,390	\$ 4,089
9	02/07	I	0.50	\$ 70,000	\$ 10,500	\$ 3,465
10	04/07	J	0.75	\$ 105,000	\$ 15,750	\$ 5,198
11	09/07	K	0.90	\$ 126,000	\$ 18,900	\$ 6,237
12	10/07	L	0.75	\$ 105,000	\$ 15,750	\$ 5,198
13	12/07	M	0.65	\$ 91,000	\$ 13,650	\$ 4,505
14	12/07	N	0.78	\$ 108,920	\$ 16,338	\$ 5,392
15	01/08	O	0.75	\$ 105,000	\$ 15,750	\$ 5,198
16	10/08	P	0.78	\$ 109,200	\$ 16,380	\$ 5,405
17	04/09	Q	0.71	\$ 98,700	\$ 14,805	\$ 4,886
18	09/09	R	0.70	\$ 98,000	\$ 14,700	\$ 4,851
19	12/09	S	0.50	\$ 70,000	\$ 10,500	\$ 3,465
20	01/10	T	0.80	\$ 112,000	\$ 16,800	\$ 5,544
21	02/10	U	0.82	\$ 114,940	\$ 17,241	\$ 5,690
22	05/10	V	0.75	\$ 104,860	\$ 15,729	\$ 5,191
<b>Total Estimated Profit Based on 33% Capture Rate</b>						<b>\$ 108,000</b>

**Forecast Profit for Facilities 1 to 20 MGD**

The estimated cost based for UV equipment for each facility is estimated assuming a peaking factor of 3 on the design flow and an actual cost for UV equipment of \$30,000 per million gallons of treated flow. The peaking factor of 3 is consistent with the peaking factor for this flowrate as identified in the Missouri Impact Report. As the flow increases,

economies of scale reduce the cost of equipment compared to lower flowrates less than 1 mgd. This equipment value would be expected to be within 15 % of the actual expected bid cost for the equipment based on experience of bidding UV equipment in the past. The equipment cost is based on a manufacturer's typical scope of supply of equipment. The engineer could specify additional options that could increase the cost of the equipment but this is not considered in this plan.

The expected profit for the UV equipment is estimated to be 10% of the equipment price. The plan estimates based on past performance that specific marketing to each customer should yield in a successful order at least 33% for each project. Thus if 33% of the projects are sold, then the company could achieve a profit of \$329,000 for the flow range 1 to 20 mgd.



**Table 4-5**

**Estimated Profit  
Flow Rate From 1 to 20 mgd**

<b>No.</b>	<b>Expiration Date</b>	<b>City</b>	<b>Design Flow: mgd</b>	<b>Equipment Price</b>	<b>Profit</b>	<b>33% Capture Profit</b>
1	10/96	AA	10.0	\$ 900,000	\$ 90,000	\$ 29,700
2	01/06	BB	3.3	\$ 297,000	\$ 44,550	\$ 14,702
3	03/06	CC	15.0	\$ 1,350,000	\$ 202,500	\$ 66,825
4	03/06	DD	2.1	\$ 189,000	\$ 28,350	\$ 9,356
5	07/06	EE	2.3	\$ 203,400	\$ 30,510	\$ 10,068
6	11/06	FF	6.5	\$ 585,000	\$ 87,750	\$ 28,958
7	01/07	GG	3.0	\$ 270,000	\$ 40,500	\$ 13,365
8	03/07	HH	2.6	\$ 229,860	\$ 34,479	\$ 11,378
9	04/07	II	2.2	\$ 197,100	\$ 29,565	\$ 9,756
10	05/07	JJ	2.0	\$ 180,000	\$ 27,000	\$ 8,910
11	08/07	KK	2.5	\$ 225,000	\$ 33,750	\$ 11,138
12	10/07	LL	1.1	\$ 101,250	\$ 15,188	\$ 5,012
13	10/07	MM	1.6	\$ 144,000	\$ 21,600	\$ 7,128
14	04/08	NN	1.0	\$ 90,000	\$ 13,500	\$ 4,455
15	04/08	OO	1.5	\$ 135,000	\$ 20,250	\$ 6,683
16	07/08	PP	1.8	\$ 162,000	\$ 24,300	\$ 8,019
17	09/08	QQ	1.9	\$ 171,000	\$ 25,650	\$ 8,465
18	10/08	RR	1.0	\$ 90,000	\$ 13,500	\$ 4,455
19	10/08	SS	1.0	\$ 90,000	\$ 13,500	\$ 4,455
20	03/09	TT	6.0	\$ 540,000	\$ 81,000	\$ 26,730
21	07/09	UU	1.5	\$ 135,000	\$ 20,250	\$ 6,683
22	08/09	VV	1.8	\$ 157,500	\$ 23,625	\$ 7,796
23	12/10	WW	1.0	\$ 90,000	\$ 13,500	\$ 4,455
24	12/10	XX	2.7	\$ 243,000	\$ 36,450	\$ 12,029
25	12/10	YY	1.9	\$ 171,000	\$ 25,650	\$ 8,465
<b>Total Estimated Profit Based on 33% Capture Rate</b>						<b>\$ 329,000</b>

## **Forecast Profit for Facilities with more than 20 MGD**

The estimated cost based for UV equipment for each facility is estimated assuming a peaking factor of 2.5 on the design flow and an actual cost for UV equipment of \$20,000 per million gallons of treated flow. The peaking factor of 2.5 is consistent with the peaking factor for this flowrate as identified in the Missouri Impact Report. As the flow increases, economies of scale reduce the cost of equipment compared to lower flowrates less than 20 mgd. This equipment value would be expected to be within 15% of the actual expected bid cost for the equipment based on experience of bidding UV equipment in the past. The equipment cost is based on a manufacturer's typical scope of supply of equipment. The engineer could specify additional options that could increase the cost of the equipment but this is not considered in this plan.

The expected profit for the UV equipment is estimated to be 10% of the equipment price. The plan estimates based on past performance that specific marketing to each customer should yield in a successful order at least 33% for each project. Thus if 33% of the projects are sold, then the company could achieve a profit of \$321,000 for the flow range above 20 mgd.

**Table 4-6**

**Estimated Profit  
Flow Rate Above 20 mgd**

<b>No.</b>	<b>Expiration Date</b>	<b>City</b>	<b>Design Flow: mgd</b>	<b>Equipment Price</b>	<b>Profit</b>	<b>33% Capture Profit</b>
1	03/07	AAA	27	\$ 1,350,000	\$ 135,000	\$ 44,550
2	05/09	BBB	23	\$ 1,125,000	\$ 112,500	\$ 37,125
3	03/08	CCC	40	\$ 2,000,000	\$ 200,000	\$ 66,000
4	12/10	DDD	105	\$ 5,250,000	\$ 525,000	\$ 173,250
<b>Total Estimated Profit Based on 33% Capture Rate</b>						<b>\$ 321,000</b>

## Forecast Summary over Estimated Profit to Year 2013

The forecast is based on identifying all the feasible customers in our territory of a minimum flow size that currently do not have disinfection and are required to comply due to the WBC classification of the water body. The customers were categorized by flow and prioritized by when the permits expire. The sooner the permit expires the sooner compliance is required.

The following table summarizes the forecasted profit by flow range with a total forecasted profit of \$758,000 to be received by the compliance deadline of 2013.

**Table 4-7**

**Summary Estimated Profits  
Flow Rate Above 20 mgd**

Item	Design Flow	Number of Facilities	Estimated Profit
1	0.5 to 1 mgd	22	\$ 108,000
2	1 to 20 mgd	25	\$ 329,000
3	Above 20 mgd	4	\$ 321,000
Total			\$ 758,000

## Forecast Breakdown of Customer by Year Profit Received

Profits are realized when the manufacturer pays the commission after the equipment is delivered and operating. Since compliance is required after 3 years of permit expiration, the plan estimates that the equipment will be installed and operating 3 years after the

permit expiration date. The following table of the estimated profit from feasible customers identified above 0.5 mgd:

**Table 4-8**

**Expected Profit Received  
Facilities Compliance Date**

No.	Expiration Date	Compliance Date	Year Paid Commission	Design Flow: mgd	Equipment Price	Profit	Estimated Profit	
<b>YEAR 2008</b>								
1	10/96	09/99	2008	10.0	\$ 900,000	\$ 90,000	\$ 29,700	
2	06/01	05/04	2008	0.7	\$ 102,200	\$ 15,330	\$ 5,059	
3	12/04	11/07	2008	0.9	\$ 127,400	\$ 19,110	\$ 6,306	
4	07/05	06/08	2008	0.6	\$ 84,840	\$ 12,726	\$ 4,200	
5	11/05	10/08	2008	0.6	\$ 84,000	\$ 12,600	\$ 4,158	
							<b>2008 Total</b>	<b>\$ 49,000</b>
<b>YEAR 2009</b>								
1	01/06	01/09	2009	3.3	\$ 297,000	\$ 44,550	\$ 14,702	
2	03/06	02/09	2009	15.0	\$ 1,350,000	\$ 202,500	\$ 66,825	
3	03/06	02/09	2009	2.1	\$ 189,000	\$ 28,350	\$ 9,356	
4	07/06	06/09	2009	2.3	\$ 203,400	\$ 30,510	\$ 10,068	
5	08/06	07/09	2009	0.7	\$ 102,900	\$ 15,435	\$ 5,094	
6	08/06	07/09	2009	0.6	\$ 77,000	\$ 11,550	\$ 3,812	
7	11/06	10/09	2009	6.5	\$ 585,000	\$ 87,750	\$ 28,958	
8	11/06	10/09	2009	0.8	\$ 105,000	\$ 15,750	\$ 5,198	
9	11/06	10/09	2009	0.6	\$ 82,600	\$ 12,390	\$ 4,089	
10	01/07	12/09	2009	3.0	\$ 270,000	\$ 40,500	\$ 13,365	
							<b>2009 Total</b>	<b>\$ 161,000</b>
<b>YEAR 2010</b>								
1	02/07	01/10	2010	0.5	\$ 70,000	\$ 10,500	\$ 3,465	
2	03/07	02/10	2010	2.6	\$ 229,860	\$ 34,479	\$ 11,378	
3	03/07	02/10	2010	27.0	\$ 1,350,000	\$ 135,000	\$ 44,550	
4	04/07	03/10	2010	2.2	\$ 197,100	\$ 29,565	\$ 9,756	
5	04/07	03/10	2010	0.8	\$ 105,000	\$ 15,750	\$ 5,198	
6	05/07	04/10	2010	2.0	\$ 180,000	\$ 27,000	\$ 8,910	
7	08/07	07/10	2010	2.5	\$ 225,000	\$ 33,750	\$ 11,138	
8	09/07	08/10	2010	0.9	\$ 126,000	\$ 18,900	\$ 6,237	
9	10/07	10/10	2010	0.8	\$ 105,000	\$ 15,750	\$ 5,198	
10	10/07	10/10	2010	1.1	\$ 101,250	\$ 15,188	\$ 5,012	
11	10/07	10/10	2010	1.6	\$ 144,000	\$ 21,600	\$ 7,128	
12	12/07	11/10	2010	0.7	\$ 91,000	\$ 13,650	\$ 4,505	
13	12/07	11/10	2010	0.8	\$ 108,920	\$ 16,338	\$ 5,392	
14	01/08	12/10	2010	0.8	\$ 105,000	\$ 15,750	\$ 5,198	
							<b>2010 Total</b>	<b>\$ 133,000</b>

**Expected Profit Received  
Facilities Compliance Date**

No.	Expiration Date	Compliance Date	Year JCI Paid Commission	Design Flow: mgd	Equipment Price	Profit	Estimated Profit
<b>YEAR 2011</b>							
1	03/08	02/11	2011	40.0	\$ 2,000,000	\$ 200,000	\$ 66,000
2	04/08	03/11	2011	1.0	\$ 90,000	\$ 13,500	\$ 4,455
3	04/08	03/11	2011	1.5	\$ 135,000	\$ 20,250	\$ 6,683
4	07/08	06/11	2011	1.8	\$ 162,000	\$ 24,300	\$ 8,019
5	09/08	08/11	2011	1.9	\$ 171,000	\$ 25,650	\$ 8,465
6	10/08	09/11	2011	0.8	\$ 109,200	\$ 16,380	\$ 5,405
7	10/08	09/11	2011	1.0	\$ 90,000	\$ 13,500	\$ 4,455
8	10/08	09/11	2011	1.0	\$ 90,000	\$ 13,500	\$ 4,455
							<b>2011 Total \$ 108,000</b>
<b>YEAR 2012</b>							
1	03/09	02/12	2012	6.0	\$ 540,000	\$ 81,000	\$ 26,730
2	04/09	03/12	2012	0.7	\$ 98,700	\$ 14,805	\$ 4,886
3	05/09	04/12	2012	22.5	\$ 1,125,000	\$ 112,500	\$ 37,125
4	07/09	06/12	2012	1.5	\$ 135,000	\$ 20,250	\$ 6,683
5	08/09	07/12	2012	1.8	\$ 157,500	\$ 23,625	\$ 7,796
6	09/09	08/12	2012	0.7	\$ 98,000	\$ 14,700	\$ 4,851
7	12/09	11/12	2012	0.5	\$ 70,000	\$ 10,500	\$ 3,465
8	01/10	12/12	2012	0.8	\$ 112,000	\$ 16,800	\$ 5,544
							<b>2012 Total \$ 97,000</b>
<b>YEAR 2013</b>							
1	02/10	01/13	2013	0.8	\$ 114,940	\$ 17,241	\$ 5,690
2	05/10	04/13	2013	0.7	\$ 104,860	\$ 15,729	\$ 5,191
3	12/10	11/13	2013	1.0	\$ 90,000	\$ 13,500	\$ 4,455
4	12/10	11/13	2013	2.7	\$ 243,000	\$ 36,450	\$ 12,029
5	12/10	12/13	2013	1.9	\$ 171,000	\$ 25,650	\$ 8,465
6	12/10	12/13	2013	105.0	\$ 5,250,000	\$ 525,000	\$ 173,250
							<b>2013 Total \$ 209,000</b>

## **CHAPTER 5: SUMMARY & CONCLUSIONS**

---

In 1996, the federal Clean Water Act established a national goal of all waterways to be fishable and swimmable. The State of Missouri finalized and passed new effluent regulations for wastewater treatment plants that discharge into these waterways providing a compliance schedule for all facilities based on permit renewal. The type of equipment identified by the USEPA and predominately used to disinfect bacteria is UV disinfection.

This marketing plan identifies specific opportunities to provide disinfection equipment represented by the company. The plan identified eliminated customers less than 0.5 mgd and classified them as small (between 0.5 and 1 mgd) , medium (1 to 20 mgd) and large (above 20 mgd). The marketing plan provides a strategic sales plan to promote and sell UV disinfection equipment to each of these customers.

### **Summary of Profit Received by Year**

The following table summarizes the estimated profits received by year from feasible customers identified above 0.5 mgd:

**Table 5-1**

**Summary Estimated Profit Paid Per Year  
Flow Rate Above 20 mgd**

<b>Item</b>	<b>Year</b>	<b>Estimated Profit</b>
<b>1</b>	<b>2008</b>	<b>\$ 49,000</b>
<b>2</b>	<b>2009</b>	<b>\$ 161,000</b>
<b>3</b>	<b>2010</b>	<b>\$ 133,000</b>
<b>4</b>	<b>2011</b>	<b>\$ 108,000</b>
<b>5</b>	<b>2012</b>	<b>\$ 97,000</b>
<b>6</b>	<b>2013</b>	<b>\$ 209,000</b>
<b>Total Profi \$</b>		<b>758,000</b>

These profits are based on profits from the sale of UV disinfection equipment only.

Additional opportunities would be realized from relationships formed in marketing each of the facilities. Thus, the impact of other equipment profits is not addressed in this plan.

The UV equipment will also be leveraged when bidding other equipment opportunities to increase expected profits.



## SUGGESTIONS FOR ADDITIONAL WORK

---

The focus of this paper was to identify those customers requiring UV disinfection to comply with new water quality regulations. A large market exists for those customers to provide disinfection through other technologies. For example, disinfecting lagoon effluent through UV equipment is difficult because of algae and other larger particles that impede the absorption of UV to disinfect bacteria.

In cases where lagoons exist, it is not simple to only chlorinate, because of additional issues of chemicals affecting aquatic life. In the author's experience, the lagoon may need to be converted to a mechanical plant leading to a number of new opportunities to supply and sell equipment that may exceed the impact of selling UV equipment alone. Further research should be performed to analyze and prepare a marketing plan to address these opportunities.

The USEPA is currently reviewing Missouri's approach to complying with bacterial limits in streams. The USEPA's approval and response is due in June of 2006 and should be closely watched to see impact to the findings of this plan.

In June 2006, the US EPA will review Missouri's approach to the swimmable goal for all waterways. Any further changes should be carefully followed to see impact to this report and those requiring disinfection.

## BIBLIOGRAPHY

---

1. Miglena Sternadori, "Projected tab for wastewater cleanup set at \$305 million in Missouri", Knight Ridder Tribune Business News. Washington, Nov 10, 2004.
2. Missouri Coalition for the Environment vs. Leavitt, Settlement Agreement, Case No. 03-4217-CV-C-NKL(W.D. Mo), by Plaintiff on October 7, 2004, [http://www.dnr.mo.gov/env/wpp/wqstandards/2004-12-16\\_SettlementAgreement\\_USEPAvsMCE.pdf](http://www.dnr.mo.gov/env/wpp/wqstandards/2004-12-16_SettlementAgreement_USEPAvsMCE.pdf), December 16, 2004.
3. State of Missouri Disinfection Workshop, "Water Quality Standards: How will your recent revisions affect your operation?", Missouri Department of Natural Resources, Division of Environmental Quality Water Protection Program, November 8-16, 2005.
4. State of Missouri Final Order of Rulemaking, 10 CSR 20-7.015, Effluent Regulations, [http://www.dnr.mo.gov/env/wpp/rules/10\\_CSR\\_20-7\\_015\\_ORM\\_CWCapproved.pdf](http://www.dnr.mo.gov/env/wpp/rules/10_CSR_20-7_015_ORM_CWCapproved.pdf).
5. State of Missouri Final Order of Rulemaking 10 CSR 20-7.031, Water Quality Standards, Sept. 9, 2005. [http://www.dnr.mo.gov/env/wpp/rules/10\\_CSR\\_20-7\\_031\\_ORM\\_CWCapproved.pdf](http://www.dnr.mo.gov/env/wpp/rules/10_CSR_20-7_031_ORM_CWCapproved.pdf), Sept. 9, 2005.
6. State of Missouri Regulatory Impact Report for Proposed Rule Amendment 10 CSR 20-7.03 Water Quality Standards, Missouri Department of Natural Resources, Water Protection and Soil Conservation Division, Water Protection Program, [http://www.dnr.mo.gov/env/wpp/rules/10CSR20-7.031\\_rir.pdf](http://www.dnr.mo.gov/env/wpp/rules/10CSR20-7.031_rir.pdf), Feb. 10, 2005.
7. State of Missouri Recreational Use Attainability Analysis Protocol, Missouri Department of Natural Resources Water Protection Program, [http://www.dnr.mo.gov/env/wpp/wqstandards/uaa/wpp\\_wqs\\_uaa.pdf](http://www.dnr.mo.gov/env/wpp/wqstandards/uaa/wpp_wqs_uaa.pdf), Nov. 3, 2004.
8. United States Environmental Protection Agency (USEPA), Ambient Water Quality Criteria Series, USEPA #440-5-80-85; Water Quality Standards Handbook, Second Edition, , USEPA #823-B-94-005a and -005b Appendices with references, August 1994.
9. United States Environmental Protection Agency (USEPA), Clean Water Act, Section 303, Adoption of WQS, Section 304, Water Quality Criteria and Measurement and 40 CFR Part 131 amended.

10. United States Environmental Protection Agency (USEPA), Gale Hutton, Director Water, Wetlands and Pesticides Division, Region 7, letter from U.S. Environmental Protection Agency (USEPA) that approved and disapproved parts of Missouri's WQS, U, Kansas City, Kansas, [http://www.dnr.mo.gov/env/wpp/rules/usepa\\_2000\\_letter-pgs1-14.pdf](http://www.dnr.mo.gov/env/wpp/rules/usepa_2000_letter-pgs1-14.pdf), [http://www.dnr.mo.gov/env/wpp/rules/usepa\\_2000\\_letter-pgs\\_15-30.pdf](http://www.dnr.mo.gov/env/wpp/rules/usepa_2000_letter-pgs_15-30.pdf) , Sept. 8, 2000.
11. United States Environmental Protection Agency (USEPA), Implementation Guidance for Ambient Water Quality Criteria for Bacteria—Draft. USEPA 823-B-02-003, <http://www.epa.gov/ost/standards/bacteria/bacteria.pdf>, 2002.
12. United States Environmental Protection Agency (USEPA), National Recommended Water Quality Criteria 1999. USEPA-822-Z-99-001, <http://www.epa.gov/waterscience/pc/1999table.pdf>, 1999
13. United States Environmental Protection Agency (USEPA), Whole Effluent Policy (WET) Control Policy: Policy for the Development of Effluent Limitations in NPDES Permits Control of Effluent Toxicity for the Protection of Aquatic Life, USEPA #833-B-94-002, July 1994.

## GLOSSARY & ACRONYMS

---

<b>CFR</b>	Code of Federal Regulations; federal rules published in the Federal Register. The environmental regulations are located in Title 40 of the CFR.
<b>Clean Water Act (CWA)</b>	An act passed by Congress to control water pollution and was formerly the Federal Water Pollution Control Act of 1972.
<b>Coliform Bacteria</b>	A type of bacteria found in human wastes and used as an indicator to determine the presence of pathogenic or disease causing bacteria in water.
<b>Compliance Schedule</b>	A schedule of corrective measures in a permit to comply with the CWA and other environmental regulations.
<b>Consent Decree</b>	An agreement to implement and execute a court-ordered instruction.
<b>CSR (Missouri)</b>	Code of State Regulations; Missouri Code of State Regulations published by the Office of the Secretary of State.
<b>Designated Use</b>	In the water quality standards, the regulations describe the appropriate intended human and aquatic life objective for a water body. Designated uses for a stream or lake include recreation, swimming, canoeing, drinking water supply and the type of aquatic life habitat that water body is to sustain.
<b>Disinfection</b>	Process that sanitizes and kills pathogenic organisms in sewage treatment effluent.
<b>Effluent</b>	Discharge from a wastewater treatment plant.
<b>Effluent Permit Limit</b>	A numerical value that restricts the quality or quantity of a discharge from a wastewater treatment plant and included in the permit.
<b>Lagoon (wastewater)</b>	A series of earthen ponds or basins treating wastewater.

<b>MDNR</b>	Acronym for the Missouri Department of Natural Resources, the water quality authority for protecting the health and environment in the State of Missouri.
<b>MGD</b>	Acronym for rate of flow denoting million gallons per day or equivalent to 694.4 gallons per minute.
<b>NPDES</b>	Acronym for the National Pollutant Discharge Elimination System, which is a national program for issuing, controlling and enforcing, permits.
<b>Outfall</b>	Point source where an effluent is discharged into receiving waters.
<b>Public Comment Period</b>	A limited period of time for the public to comment and respond to proposed activities contained in draft reports.
<b>Sewage</b>	The used water and human waste from a community which is carried away by drainage pipes and sewers.
<b>Stream</b>	A term for a natural water body of flowing water for at least part of the year.
<b>UAA</b>	Acronym for use attainability analysis, which is a scientific assessment of a body of water to determine the designated use of the water quality standards.
<b>Ultraviolet Disinfection</b>	The use of ultraviolet light to destroy bacteria. In this process, UV light is absorbed by proteins, RNA and DNA in a microorganism. In high doses, the cell membrane is disrupted and the cell dies. At lower UV doses, absorption of UV disrupts the ability of the microorganism to replicate and inactivates the cell.
<b>Ultraviolet Light</b>	Radiation having a wave between 100 and 4000 angstroms. Ultraviolet light is used as a disinfectant
<b>USEPA</b>	Acronym for the U.S. Environmental Protection Agency, the federal agency responsible for the Clean Water Act and other federal environmental regulations.
<b>Water quality</b>	A qualitative description of the physical, chemical and biological characteristics of water.
<b>WBC</b>	Whole Body Contact or Whole Body Contact Recreation activities are with direct human contact with the raw surface water to the point of complete body submergence. The raw

water may be ingested accidentally and certain sensitive body organs, such as the eyes, ears and the nose, will be exposed to the water. Although the water may be ingested accidentally, it is not intended to be used as a potable supply unless acceptable treatment is applied. Water so designated is intended to be used for swimming, water skiing or skin diving.

## **APPENDIX**

---

The appendix including specific marketing plan for the company is available under a separate cover.